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INFORMATION TECHNOLOGY CONFERENCE

MAY 24, 1989

PROVINCE OF NEW BRUNSWICK

FREDEDERICTON

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NEW BRUNSWICK GOVERNMENT
INFORMATION TECHNOLOGY CONFERENCE

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INFORMATION TECHNOLOGY CONFERENCE

WELCOME

By Thomas Parker

Conference Chairperson

Welcome to the seventh Information Technology Conference. On behalf of the Information Services Group of the Department of Supply and Services, the Planning Committee for this conference is pleased to offer you an intensive day structured around the theme of *USERS' CHOICE OF SELECTED INFORMATICS*.

We hope the speakers presented today will meet the expectations you defined in a recent survey, circulated to determine the interest you, the users, had in topics related to both your work day concerns, and your interest in future technology and issues.

The format selected this time is built on the premise that there is value in offering a single intensive day. The high interest, as evidenced by your attendance this morning, seems to indicate that this is so. So please let us know what you think of the format, the presentations, the facilities, in conversations over lunch or coffee, or by dropping a note to the Information Services Group.

The demos traditionally offered at this Conference have been approached a little differently. As many of you know, the demos are being presented in the coming weeks, on a pre-registration basis. Each of you who registered should have a schedule now of your dates and times. If you have any questions, please approach one of the committee members, before you leave today.

In looking over the agenda for today, I was reminded of a story I heard recently that seemed particularly relevant: A little boy walked into a public library, and somewhat hesitantly approached the librarian's desk. 'Excuse me, he said, I'd like to know something about turtles.' The librarian was so impressed by this young boy's straight-forward approach, that she immediately jumped up, rushed over to the catalog, consulted her cards, perused her indices, and vanished into the stacks. Some time later she reappeared, carrying an enormous load of books. The young fellow took one look at her, and turned quickly to head for the door. 'Excuse me, she said, what's wrong?' 'Lady, the young boy replied, I didn't want to know that much about turtles'.

I hope we don't enjoy the same fate as that librarian, and that we offer you a selection of timely presentations that you will profit from.

Our first speaker is Mr. Jerrie Fowler, Assistant Deputy Minister of Supply and Services, who will open the Conference.

INFORMATION TECHNOLOGY CONFERENCE

FREDERICTON INN MAY 24, 1989

OPENING REMARKS

by

Jerrie Fowler
Assistant Deputy Minister
Department of Supply and Services

INFORMATION TECHNOLOGY CONFERENCE

OPENING REMARKS

BY JERRIE FOWLER
A D M - Supply and Services

First of all, I am going to make my introductory remarks rather brief. I would like to welcome everybody here on behalf of the Information Services Group of the Department of Supply and Services.

I think that over the years, of the things we have done right, organizing this Conference is certainly one of them. Looking at the participation, and the feedback that we have gotten from these conferences, I think they have provided everybody with an opportunity to share ideas and experiences. I think that everybody has had an opportunity to find out about new things that are going on, as well as the ability to prevent themselves from re-inventing the wheel. As a result of that, I think this Conference has made a great contribution to the overall efficiency of Government, and has probably made all of us more productive users of technology.

A couple of years ago, at one of these conferences, I expressed my views on where end-user computing was going. I want to take some time today to give you an update on where I think it is going and expand on what we have done since that time.

We spoke then on the importance of end-user computing having a good relational database software. You will see that later at this Conference, there are presentations by the vendors on Relational Database. I might take this opportunity to reiterate what I feel are requirements for good relational database software. I put in a pitch for the need for standardizing across Government on this technology, because if we are going to get away from technological islands that, we more or less, have created in Government. I think everybody can point to individual productivity but if we are going to get the full use of information technology, I feel we are going to have to look at improving our ability and means to access and move data across the organization. I think we will only be able to achieve that through standardization of software, and perhaps in time of Operating Systems as the world moves to Open Systems Integration.

The first thing I would like to address is the relational database software. As we said before, there are some requirements in end-user computing: good relational database, full programmer productivity tools, graphics, word processing, spreadsheets, desktop publishing, electronic mail and messaging, application builders. In a number of areas, we require some standardization. A relational database is one of those, many of the others, perhaps not: there are various graphics software packages; in word processing, we have mainly accepted two commonly used packages, Word Perfect and Microsoft Word. If we are to achieve commonality in electronic mail and messaging on a Corporate wide basis, then we will have to provide some interfaces at a central level to achieve full effectiveness, but we could probably get by using the various technologies that exist there. In Spreadsheets, Lotus and Microsoft Excel now seem to be the two standards, so by virtue of the products in the market place, we have moved towards some sort of standardization.

Now, with regard to relational database software, I would like to define what some of their requirements should be. I would like you to keep this in mind when you hear the vendors addressing you later in the conference and maybe use this as some basis for questions. First of all, a good database package should have an active data dictionary, a capability to select multi physical files, good fourth GL interface, good query language, good end-user productivity tools, and also referential integrity. I think in time as we move towards government-wide end-user computing, we will see basically three types of terminals: the basic terminal used for data entry, the desktop computer for those who need to do computing work at their desk, and for people like myself, and those at the senior management level, eventually the advanced telephone, which will have the ability to do electronic mail, messaging. I doubt very much that any of us will be doing any spreadsheet analysis or writing any DBase programs or other computing work, but we will need to have access to information and the ability to move data and messages across the organization, and I can see a time when this will happen on the basic telephone.

I would like to talk to you on the future activity towards integrated end-user computing. For those of you who are not aware of this, we have made a start towards the development of the Corporate database. A project has been initiated by the Board of Management to develop the first Residential Information database, which is one of the recommendations made by the DMR people in the Technology Strategy that was recommended a year and a half ago. So we have started that one, and the next one we will be looking at is the Legal Entity database. We will keep you posted on the progress, because they have just begun.

On the development of a Province-wide E-mail system, we have recently agreed with NBTel to at least link all the Wang-VS's in Government together. This will give the Central Agencies the ability to communicate with one another. Our next step is to give everyone the ability to communicate with the Central Agencies. I suspect that within most Departments, 80 to 90% of the communications are internal, some portion with Central Agencies, but rarely with other Departments, for example there is little need for Health to exchange information with , say, Transportation because they are in fact in different businesses. But we, of the Central Agencies at the Corporate level, have an obligation to ensure that the facilities exist to move information across the organization. And as you know from the previous Conference, we are in the process now of installing our Province-wide communications network which I expect will be up and running by September of this year.

The adoption of the Technology Strategy study done by DMR has been more or less accepted by the Steering Committee made up of Deputy Ministers. There is one exception to that: I think the recommendation made by DMR was to move towards an IBM mainframe environment, but the Steering Committee has decided, as a mainframe technology, to stay with the UNISYS, and concentrate their efforts in moving towards UNIX and OPEN SYSTEMS, rather than moving from one proprietary system to another. I guess the general feeling of myself, and other members of the Committee is that we could spend a lot of time, effort and money moving to an IBM proprietary system, and still, in several years, want to go towards Open Systems, so why not start the move towards Open Systems now.

The development of Policy and Procedures consistent with that policy have been started by Gerry Henry as Chief Information Resources Officer, and they will be brought forward first to the Information Systems Advisory group made up of Information Systems Directors, and then on to the Steering Committee and eventually, for the policy issues, forward for adoption to the Board of Management itself.

With regard to moving towards Integrated Systems, I think it is a direction we must follow, together with standardization on software, and eventually on Operating Systems. There is a commitment by the Steering Committee, at the senior management level, to make the move towards Open Systems Integration.

This is a matter that we will be pursuing with our colleagues of the ACIG group, which is a collection of Information Systems people across Canada, including the Federal Government, who will be meeting in August. I think everybody feels that, if collectively in Government, we can move to OSI and developing standards in that area, then we will accelerate the move and vendors moving towards OSI. Collectively, Governments in both Canada and the United States, probably make up the bulk of the purchasing power of the computer related field. I guess it is money that talks, for example the US Government's award of System-V to AT & T over DEC, which triggered DEC's immediate announcement to move towards a UNIX based system.

Regarding creation of fourth generation data: looking at effectiveness versus efficiency, I think we will be seeing most of the development done in Fourth Generation Languages in the future, and the generation of more 4GL data. Most of the data we have now is 3rd generation data, so you can't do very much with it until you get down in an environment where people can work with it.

In the area of Software standardization, we must move towards common 4GL's and relational database packages, simply because in government we are constantly changing, and as pieces of Departments move from one to the other, we don't want to be bound by the technology that one Department may be using. Also, when it comes to training, we could splinter our people to the point that it becomes impractical to maintain the number of different software. Therefore we should be moving towards some standardization there, and without necessarily advocating one in particular, we should endeavor to keep the numbers to a useful minimum.

In the field of rationalization of Departmental technology, everybody has an obligation to look at where they are heading with technology and make sure they are making effective use of technology across Government. In that respect, we have helped people in doing what DMR have referred to as IRP's and assisted Departments in examining their data and technical architectures, and how that might fit in with the overall Corporate strategy.

There are some limiting factors to these concepts. One of them is funding. We are in an environment where we are closing hospital beds, and having problems in financing the educational system. Finding funding for technology for administrative purposes is always difficult, but it can be made easier if we can demonstrate to the political powers that we are using technology effectively, and improving productivity, and improving effectiveness in the delivery of programs.

Also, skilled resources are difficult to find. As many of you know, we can find junior or intermediate skills quite readily, but trained skilled resources are harder to come by.

The absence of inter-departmental strategic direction, is another factor that comes into play. Each department has gone its own way in many respects, and it is only now that Senior Management, together with Information Directors, realize collectively that we must start looking at where the whole organization is going strategically, not just individual Departments.

There are some internal and external social implications, basically the coming again of working together. Focus on tactical operational issues have an impact also: as the old adage goes, when your neck deep in alligators it is difficult to remember that the primary objective is to drain the swamp. When people are faced with immediate operational problems, it is hard to see the long-term or strategic view.

The bureaucratic culture plays its role. Everybody likes to protect and build their own empire or operations, but I think the time has come that we have to put a lot of that behind us and look at the common good. Information Systems group also, including but not exclusively the ISG world at DSS, have too often been obstacles to the effective use of technology, in trying to control all activities from the center.
We must move away from that, not only the central group in DSS but also information system groups in general. Our primary role should be one of training and educating people in effectively using technology.

Another obstacle is Senior management. Many of you will recognize that senior management is often not as educated in the use and opportunities that technology presents as they should be, but we in information systems as a whole must assume some of the blame for that, and must make an effort to raise their level of interest and commitment to better uses of technology. I have seen evidence of marked changes in this direction in the last couple of years with the formation of the Steering Committee of Deputy Ministers, most of whom have a real interest in what is going on and where the organization as a whole is going. I think many of the older senior managers may be wishing to outlive the application of technology without direct involvement, but at the pace at which technology is moving, I don't think they will be able to without early retirement. Most have accepted that fact now and there is an awareness that exits now which creates an opportunity to educate and get commitment from the senior management group in the use of technology. I must add that this is generalization, because I know that in some instances this is already happening.

I know that I was only supposed to introduce the Conference, but after finding these slides quite accidently, I thought that sometimes it is important to reiterate a message many times to get people to retain it. And I have taken the opportunity to do that.

I will not hold proceedings up any longer, so welcome to the seventh Information Technology Conference.

INFORMATION TECHNOLOGY CONFERENCE

FREDERICTON INN MAY 24, 1989

ARTIFICIAL INTELLIGENCE

by

Dr. B. G. Nickerson
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Artificial Intelligence
(Can Computers Think?)[1]

by

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June 6, 1989

Intelligence is one characteristic that most people agree sets humans apart from other creatures. How do we measure such intelligence? One measure used by psychologists is the IQ test. The intelligence quotient is defined as a person's mental age divided by their chronological age, with the result multiplied by 100. As an example, if a person's mental age was measured as 12, and the person was 10 years old, then their IQ would be 120. Even though defining a person's mental age is a controversial subject, it can be said that if two people with significantly different IQ's are discovered, then the person with the higher IQ is probably more intelligent (in a general sense).

Computer Intelligence

But can computers think? Are machines capable of being constructed such that they display what is considered intelligent behavior? The words **artificial intelligence** are said to have been coined by John McCarthy (now a professor at Stanford University) at a conference held at Dartmouth College, Massachusetts in 1956. This conference was held to determine if aspects of learning and human intelligence could be so precisely described that a machine could simulate it. Even before 1956 Alan M. Turing [1950] proposed a test, now called the **Turing test**, to determine if a computer was thinking. The test takes place in two phases as follows:

- In phase I (see Fig. 1), an interrogator in a separate, closed room communicates via remote terminals with a man and a woman, also in separate closed rooms. The interrogator must try to determine which room contains the man, and which room the woman. The rules of the game require the man to try to fool the interrogator into thinking he is the woman, and the woman to try to convince the interrogator that she

[1] A paper presented at the Information Technology Conference, Fredericton, N.B., Canada, May 24, 1989; sponsored by the Dept. of Supply and Services, Province of New Brunswick.

is the woman.

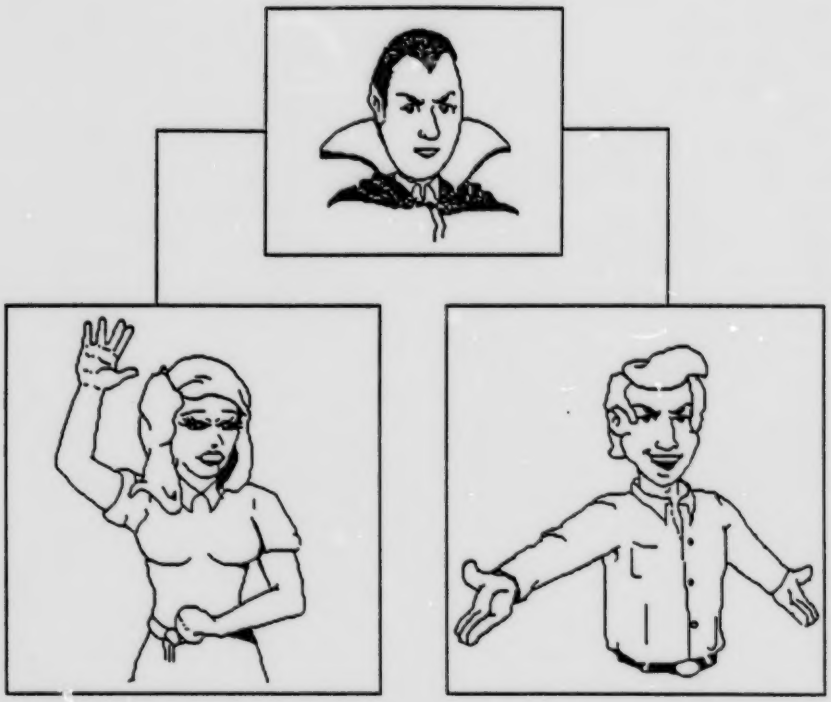

Fig. 1. Phase I of the Turing test [from Firebaugh, 1988].

- In phase II (see Fig. 2), the man is replaced by a computer, and the game resumes. If the computer can deceive the interrogator as often as the man did, we say that the

computer is displaying intelligence.

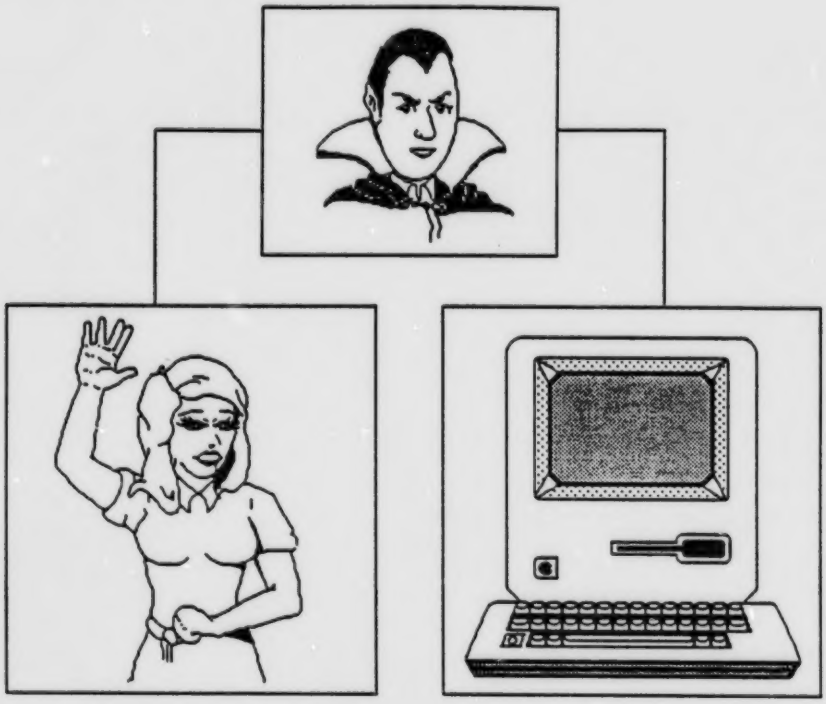

Fig. 2. Phase II of the Turing test [from Firebaugh, 1988].

In the years since the 1950's, there has been a large growth in research in and applications of artificial intelligence. Modern definitions of artificial intelligence abound, but two which I like are as follows:

1. "The study of how to make computers do things at which, at the moment, people are better."
2. "The science of making machines do things that would require intelligence if done by men."

Both definitions are appealing; the first because it recognizes that artificial intelligence is a dynamic entity; the second because it considers artificial intelligence to be a science.

There are five general sub-areas of artificial intelligence activity today. These are

- game playing

- automated reasoning (automated theorem proving)
- perception
  - computer vision
  - natural language understanding
- robotics
- expert systems

Besides these sub-areas, the topics of general search strategies and symbolic computer languages (such as LISP and Prolog) also fall under the broad artificial intelligence umbrella.

Game Playing

Despite its seemingly impractical nature, certain types of game playing fall naturally into the artificial intelligence bailiwick. Games such as checkers and chess, which rely solely on the mental activities of the players for their progression, give an opportunity for direct comparison of humans and computers. A computer chess program called Hitech has a chess rating equal to that of international masters. Some computer scientists predict that a computer chess program will defeat the human world champion by 1990 to win the $100,000 Fredkin Prize.

Lest one is lulled into thinking that computers will then have conquered the world of game playing, the Chinese game of GO is even more complex than chess. The number of possible plays in a chess game is estimated at 10^{120}, whereas the number of possible plays in a game of GO is approximately 10^{761}. Research into ways of playing these games successfully on the computer leads to new insights into how human thought processes can be encoded.

Automated Reasoning

Since the early days of computers, researchers have tried to get computers to automatically prove theorems. Both propositional calculus and the more general predicate calculus have been used as the basis of general theorem provers. The logic programming language Prolog is a practical implementation of the language of predicate calculus. Developments in this area point the way to more practical applications such as verification of computer program correctness or validation of electronic circuit designs.

Perception

The human experience is to a large degree governed by what we see and hear. Automating these capabilities is a most difficult task which is still in the early stages of development. Part of the difficulty stems from the large amounts of information perceived by the eye and

ear, and subsequently processed by the brain. The eye, for example, has approximately 100 million rods and cones which act as the primitive sensors for the brain.

Despite the complexity of human perception, industrial computer vision systems can now provide automated inspection tasks and simple decision making capabilities. Usually a CCD camera is used to capture images which a computer program can subsequently process and analyse. Elements of computer vision systems include image processing, pattern classification or pattern recognition, and scene analysis.

Robotics

The dream of building machines which emulated human actions existed long before computers were thought of. The idea of building a robot which looked exactly like a human has given way to the industrial robot which usually consists of a single arm with multiple joints. Some researchers feel that robotics is separate from artificial intelligence since it involves so many classical engineering components such as control theory, kinematics, dynamics, sensor development and geometry. A large overlap between the two fields exists, especially as robots incorporate more decision-making capabilities. Research in the area of robotics continues due to the advantages machines have over humans; namely, that machines do not breathe, machines are strong, and machines are precise, repetitive and tireless.

Expert Systems

Expert systems have been shown to have great commercial potential during the past 10 years. The classical definition of an expert system is

> "A computer program that uses heuristic knowledge and inference procedures to solve problems difficult enough to require significant human expertise."

Note that an expert system is a computer program, but one with very special characteristics. The principle characteristics are

- An expert system normally addresses a specific focussed task much like a human expert would.
- The knowledge is separate from the reasoning method.
- The expert system can explain its own actions.

Fig. 3 shows a block diagram of the components of an expert system.

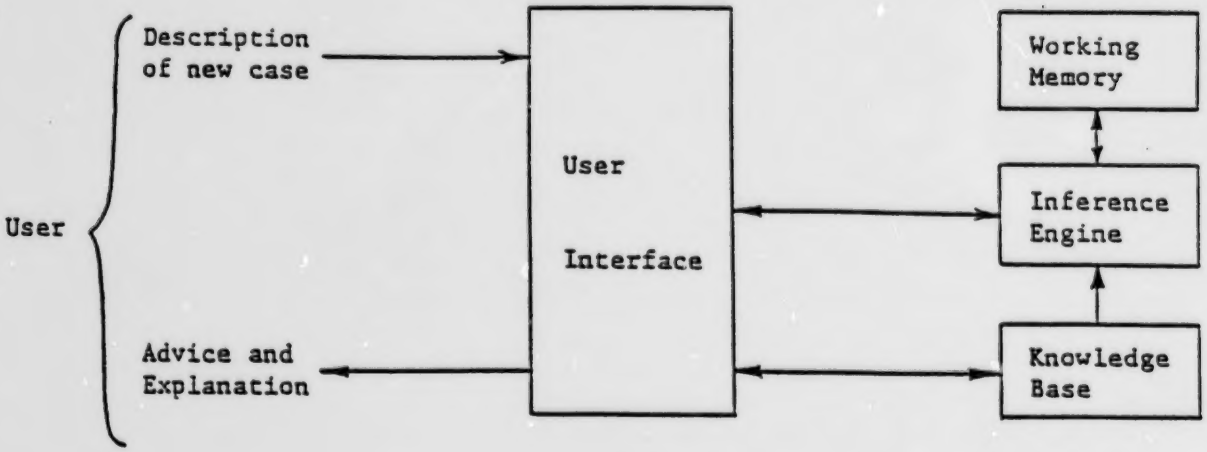

Fig. 3. Block diagram of an expert system.

Note the large user interface box through which both the developer and the user of the expert system communicate. A large sized box is used here to indicate the large amount of time normally spent on this aspect of the expert system. Estimates of the time required to build the user interface range anywhere from 50% up to 90% of the total time to build an expert system.

The most important advantage of an expert system over another computer program is the separation of the knowledge from the reasoning mechanism (also known as the inference engine). This facilitates production of a knowledge base which is much easier to understand and subsequently to modify. In turn, this can lead to the improvement of the knowledge base, which means that the expert system gains value as time goes on.

A key difference between expert systems and "ordinary" computer programs is the way in which knowledge is represented. A knowledge base typically consists of a set of rules and a set of objects about which the rules can reason. For example, a set of flight facts might be represented as

```
(flight 113 Halifax Fredericton)
(flight 113 Fredericton Toronto)
(flight 113 Toronto Winnipeg)
(flight 428 Halifax Fredericton)
(flight 428 Fredericton Montreal)
(flight 327 Halifax St.John)
(flight 327 St.John Boston)
```

A rule which used these facts to print out any stopover cities when flying from Halifax to Montreal or Boston would look like the following:

```
(defrule ex-1 "Stopover cities from Halifax to Montreal or Boston"
   (flight ?fl Halifax ?stop)
   (flight ?fl ?stop Montreal|Boston)
=>
   (printout t t "Stopover city for flight " ?fl "is" ?stop))
```

In English, this rule might read something like "If you can find a flight from Halifax to anywhere, and if you find a second flight which has the previous flight's arrival city as it's departure city and the final destination is Montreal or Boston, then print out the stopover city."

Besides facts and rules, some expert systems have the capability to describe objects using a hierarchical method known as frames. A frame-based approach to knowledge representation allows objects to automatically inherit attributes from its ancestors. This greatly simplifies keeping track of large numbers of objects which are interrelated.

When developing an expert system, typical software development strategies (e.g. proposal and plan (including requirements definition, money, time-frame, deliverables), initial prototype, prototype evaluation and testing, full-scale implementation and system integration, full-scale system testing and evaluation, and long-term evolution) are used along with the additional requirement of knowledge acquisition. Knowledge acquisition is normally performed by someone called a **knowledge engineer** who has a good understanding of different ways to build an expert system. Even though an expert system could be built from scratch using a traditional computer language, the easiest way is to use an **expert system shell**. Expert system shells are very useful since

- They already have an inference engine.
- Knowledge representation methods are in place.
- Truth maintenance, explanation and user interface facilities are normally available.

There are many different expert system shells, ranging from the $300 PC shells up to large hybrid shells costing $65,000 running on advanced workstations. Typically, the large hybrid shells provide much more powerful knowledge representation methods, more sophisticated development tools, better truth maintenance and a complete link to the graphics capabilities of the workstation. Larger expert systems (more than 1000 rules) typically require a powerful shell for their development and subsequent evolution.

Two of the most important expert systems developed to date are MYCIN and XCON. MYCIN is the grandfather of almost all of todays expert systems. MYCIN was the first to

demonstrate that an expert system could perform better than the best human experts in its field of expertise (which was the diagnosis and recommendation of antimicrobials for cases of acute infectious meningitis) [Buchanan and Shortliffe, 1984]. XCON configures VAX computer orders for Digital Equipment Corporation. XCON is estimated to save DEC approximately $40 million per year and currently has over 17,000 rules in its knowledge base [Barker and O'Connor, 1989].

There are also numerous other examples of successful expert systems currently in use. Buchanan [1986] gives a summary of some of them.

UNB

There is a strong interest in artificial intelligence at UNB. Four different engineering professors are investigating the use of expert systems technology in their research. In addition, there is an **AI Group** within the School of Computer Science composed of seven professors. They include Dana Wasson (pattern recognition), Bernd Kurz (computer vision), Steven Rauch (symbolic languages), Brad Nickerson (expert systems), Eric Neufeld (automated reasoning), Lev Goldfarb (pattern recognition), and Rod Cooper (databases and AI). UNB also offers academic training with the following courses:

- CS4725 Introduction to Artificial Intelligence
- CS6755 Expert Systems and Fuzzy Sets
- CS6925 Pattern Recognition
- CS6945 Image Processing

An AI Laboratory is also in the process of being established.

Conclusions

Artificial intelligence continues to grow and mature as a science. There are a large number of different topics which fall under the umbrella of artificial intelligence. Currently, there are computer programs which perform better than their human counterparts in certain very specialized tasks. These tasks are normally considered to require intelligence in order to perform them well. In some sense then, the answer to the question "Can computers think?" is affirmative.

Expert systems are different from other computer programs. Their primary advantage is the separation of knowledge from control, which means that the long-term evolution of an expert system is much easier than with traditional computer software. Expert system shells can provide a lot of help in building an expert system. The bottleneck normally comes at the knowledge acquisition stage where the knowledge of one or more human experts is encoded. Do not underestimate the time required to build a good user interface.

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INFORMATION TECHNOLOGY CONFERENCE

FREDERICTON INN MAY 24, 1989

UNIX EXPLORED

by

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UNIX EXPLORED

by

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June 6, 1989

The UNIX operating system was created about twenty years ago for a moderate sized minicomputer. As minicomputers became more powerful, UNIX became a mainframe operating system. As desktop computers became more powerful, it also became a personal computer operating system. This paper explores the capabilities of UNIX as an alternative to other operating systems.

INTRODUCTION

UNIX is an operating system. It is useful to explore this notion further. A computer's existence is usually justified by the application programs which it runs. An operating system can be viewed as a utility program which provides the applications with certain common services. For example, an operating system usually organizes the disk storage of a computer into files and directories and provides file access services to the application programs. This makes applications more economical to develop because it is not necessary to include this support code in each application. The operating system also defines standards, such as file formats, which allow applications to cooperate and exchange data more easily than would be possible without such standards. (Unfortunately, such standards are not complete enough to allow universal data interchange!)

Actually, the name UNIX is used in three different senses. First, it refers to the program which is loaded into memory when the computer is started, and which remains in memory during execution of all application programs. This program, the UNIX kernel, represents the heart of the operating system. The name UNIX also refers to the collection of utility programs which are supplied with the kernel. These include programs to list directories, make backup copies of disks, etc. Finally, selection of the UNIX operating system determines the applications which are available. Such

applications are specific to a particular operating system. Those written for PC-DOS, for example, will not run under UNIX. Thus choice of the operating system determines the set of applications which are available for the system. In this general sense, a UNIX system comprises the operating system and all the UNIX specific application programs which run within this environment.

A BRIEF HISTORY OF UNIX DEVELOPMENT

It is useful to review the development of the UNIX operating system because its history explains some of its characteristics. In 1969, several researchers at Bell Laboratories in New Jersey developed an operating system for a PDP-7 computer which had been retired from its commercial application. These researchers, under the direction of Ken Thompson, used ideas from a previous project called MULTICS which had attempted to design a large multi-user operating system. Because the new system was intended for one user (or a small number of users), it was called UNIX.

The UNIX system was used internally within Bell Labs for several years. In 1976, the then current version, called "Sixth Edition (V6)" after the edition of the documentation describing it, was made widely available outside of Bell Labs, particularly to universities for educational purposes. The University of California at Berkeley (UCB) made many local modifications to UNIX, including adding support for the Department of Defense Research Agency (DARPA) networking protocols (TCP/IP). UCB made its modifications widely available to other universities. These versions, particularly the "4BSD" version for the VAX computer first released in 1979, became more popular at universities than the versions released by Bell Labs.

In 1982, the UNIX support group (USG) of AT&T released the System III version as a commercial product. This was eventually replaced by the System V UNIX product, first released in 1983. These versions from AT&T are intended as a commercial software product.

STRENGTHS AND WEAKNESSES OF UNIX

UNIX is not the solution to all problems in information processing. As with every product, it has strengths and weaknesses which make it a good choice in some circumstances and a bad choice in others.

1. UNIX is available for a variety of computer systems.

The principal attraction of UNIX is that it was designed to be easily modified ("ported") to a large variety of different hardware systems. It is much easier to move UNIX to a

computer system than to write an entirely new operating system. In moving UNIX to a new system, small portions are rewritten to accommodate the particular characteristics of that system. The bulk of UNIX, written in the "C" programming language, need only be recompiled by a compiler generating code for the new computer. A version of UNIX adapted (transported) to a particular model of computer is often called a "port" of UNIX.

An installation can upgrade from one computer to a different manufacturer's system running UNIX with significantly less training than would be the case if different proprietary operating systems were involved. Note, however, that a version of UNIX customized to the particular hardware must be obtained. Because different machines typically have different machine instruction sets, the binary versions of application programs for one system will not run on the new system. Even if the instruction set is the same, a given binary program will not necessarily run under two different "ports" of UNIX because of differing conventions in the system interfaces. New versions of commercial applications would need to be procured for the new system. (There are currently attempts to define a standard system interface, called a "Binary Compatibility Standard" (BCS), for each machine instruction set. This would allow an application developer to distribute one binary version for, say, the INTEL 80386 machine, which would run under all ports of UNIX for the 80386 which adhere to that standard.) Locally developed applications hopefully only require recompilation, though subtle differences between UNIX ports might require some reprogramming.

2. UNIX is heavily used in research.

The UNIX system is very heavily used at universities and other research institutions. Many new developments become available first in the UNIX environment and are later moved to operating systems. A number of engineering design applications were first developed for UNIX. Also, the heavy use of UNIX at universities produces many students with good training in the use of UNIX. They will require less orientation if their first employers are using systems compatible with those used at their educational institutions.

3. UNIX is multi-tasking.

UNIX is a multi-tasking (and multi-user) operating system. It was designed from the first to accommodate the presence of many applications, all active simultaneously. Simpler operating systems, such as PC-DOS, were not originally designed for such environments. Although a number of developers have provided add-on features to allow simultaneous activity, these must necessarily represent a compromise. The increasing reliance on desktop computers, for example, to maintain telephone directories and log telephone calls, requires ease of switching among applications as, say, financial analysis work is interrupted by a phone call. Similarly, it is desirable that the networking application remain active simultaneously with all other applications so that these latter

applications may have full use of the networks' facilities. This multi-tasking is one of the principal driving forces for the replacement of the PC-DOS operating system by OS/2.

4. UNIX supports a wide range of computer sizes.

The UNIX operating system can be used on computer systems from the largest mainframes down to desktop computers. (UNIX does require the more powerful personal computers now appearing. The older, less powerful machines do not provide certain features, such as memory management, necessary for a production version of UNIX.) IBM has announced its intention to make AIX, its version of UNIX, available on its full product line. This provides obvious benefits for training, data exchange, and administration of the large variety of computers used in a modern enterprise.

5. UNIX is supported by many system developers.

UNIX is provided in source form to research institutions and to organizations responsible for porting the system to new computer systems. This results in new facilities being developed by a larger number of organizations than would be the case for a proprietary operating system whose source code is not released outside of the developer's organization. Several new UNIX facilities have been released by their developers' for use by other organizations. The Network File System (NFS) developed by Sun Microsystems to allow networked UNIX systems to share each others' files and directories is a typical example. Developed originally by Sun for their workstations, this software is now available for a wide variety of UNIX ports.

CURRENT DEVELOPMENTS

UNIX is an "open system" in the sense that hardware running the UNIX operating system, ports of UNIX, and, as well, applications to run under UNIX are available from a large number of firms. This does pose inter-working problems when products from different suppliers are combined. Therefore, significant activity is taking place in the development of standards.

As previously described, UNIX is made available for a particular model of a computer system by obtaining one of the major source versions of UNIX, called the "porting base," modifying certain system dependent portions of the source code, and then recompiling the source code using a compiler which produces code for the target system. This porting may be done by the manufacturer of the computer system, by a software firm under contract with the manufacturer of the system, or by an independent software firm who sell the result as a product.

Currently there are several major "porting bases" for UNIX. AT&T produces SYSTEM V UNIX. The University of California at Berkeley supplies the 4BSD release of UNIX. Several system manufacturers ported a previous version of UNIX to their systems and added significant enhancements. These companies have opted to continue development of their enhanced versions rather than attempt to move their enhancements to a new version of their porting base. For example, Sun Microsystems originally adopted a release of the 4BSD version of UNIX. They are continuing development of this system under the name SUN OS. Similarly, Digital Equipment Corporation (DEC) has a version of UNIX named ULTRIX available for its VAX line of computers. IBM, as previously mentioned, has AIX available for its RT and PS/2 lines, and will have it available for other lines in the future.

The incompatibilities which exist among the different versions of UNIX cause some problems for software firms distributing UNIX applications. These applications must be produced is slightly different versions for the major lines of UNIX, and then compiled and tested on a number of different hardware systems. Recently, some attempts have been made to combine the features of various versions of UNIX into a single version. AT&T entered into an agreement with Sun Microsystems to merge the SUN OS and System V lines into a, hopefully, universal UNIX. Similarly, Microsoft, with its XENIX version of UNIX for the high-end PC machine entered into an agreement to merge the XENIX features with System V, producing a single line of UNIX versions for these machines (although a variety of companies would, presumably, continue to produce individual ports of this System V line for the PC).

The effort to combine SUN OS and System V has produced a large amount of controversy. Several companies producing workstations in competition with Sun apparently felt that because of Sun's direct involvement with the project, it would enjoy a competitive advantage. These companies formed the Open Software Foundation (OSF) whose aim is to produce a UNIX line which is not under control of AT&T. They have decided to adopt a future release of IBM's AIX as the base for their porting system. Although each member would port this base to their own hardware system, and add proprietary enhancements, the common porting base would be defined in enough detail to provide a standard to which application developers would design. OSF is also actively defining standards for related areas, such as a standard user interface for applications. Such a standard would enable applications purchased from independent vendors to have a unified "look and feel."

AT&T, presumably recognizing the competition arising for the System V line, have established "UNIX International" to give the System V developers a greater say in the development of the porting base.

THE FUTURE

Three types of operating systems are vying for a share of the market. First are the proprietary operating systems produced by a manufacturer of hardware systems and intended for use by customers of that manufacturer. IBM provides several such operating systems. MVS and VM are available for the 370-style mainframes. OS/400 is available for the 400-series machines. OS/2 is available for the PS/2 series machines. IBM recognizes that many organizations will use a mixtures of these machines and has proposed the Systems Application Architecture (SAA) which will provide standards for applications to be implemented on more than one of these proprietary systems. DEC produces the VMS operating system for its VAX line.

The second major type of operating system is that produced by an independent software vendor and intended for a number of systems from different manufacturers but with a very consistent architectural design. (Such systems are usually referred to as "clones.") For example, MS-DOS, produced by Microsoft, is available for machines based in the PC architecture. Presumably Microsoft will make OS/2 available as a generic operating system as well.

UNIX represents the third major type of operating system: it is intended to be ported to a number of widely differing machines and to allow the same applications to be available within an organization on many different machines.

Data recently quoted in Unix World (January 1989, p. 40) gave projections for installed operating systems for 1989 and 1993 as follows (in thousands of units).

Operating system	1989	1993
Proprietary	9,085	18,985
UNIX,XENIX	776	1,457
OS/2	924	8,523
MS/PC-DOS	9,851	10,158

Note the large growth predicted for OS/2, partly due its relative newness. UNIX is predicted to approximately double in number of installations. MS/PC-DOS is predicted to remain relatively stable. Not everyone will agree with such figures, of course. It remains to see how UNIX and the open systems idea will overcome the problems, such as requiring recompiling the source for an application on each different type of hardware.

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Schnatmeier, Vanessa. "Great Expectations," *Unix World,* vol. VI, no. 1 (Jan., 1989), pp. 36-42.

INFORMATION TECHNOLOGY CONFERENCE

FREDERICTON INN MAY 24, 1989

BROADBAND NETWORK PRESENTATION

by

D. J. (Mick) CAMPISANO
Manager, Information Systems
Dr. Everet Chalmers Hospital

INFORMATION TECHNOLOGY CONFERENCE

BROADBAND PRESENTATION
by
D. J. CAMPISANO

Good morning ladies and gentlemen. My name is Mick Campisano and I'm the Director of Information Services at Dr. Everett Chalmers Hospital.

I would like to thank the Conference Committee for inviting me to speak to you this morning.

Also, I would like to take this opportunity to acknowledge the efforts of Bruce Fitzgerald for his contribution. Bruce was with Sytek Inc. in Toronto and after we put this concept together he was so convinced that we had come up with such a viable solution for hospitals that he has now started his own business called Vivid Technologies and is attempting to market this concept to hospitals across Canada.

PREAMBLE

With technology changing every day it is impossible to be current. However it is impossible to be aware of what is available. May I suggest you build yourself a reference manual of articles and contacts so you can easily access the technology best suited for a certain situation and the people who can supply the expertise required.

TOTAL SOLUTION

When I joined Chalmers Financial Information Systems were already in place and Patient Information Systems being developed. It soon became apparent to me that these were not the only system needs of the hospital. There were numerous requests not only for sharing current information more readily but for the collection and distribution of various other forms of information. At this point it was felt that a total solution would be inevitable if we did not want to be burdened with numerous individual isolated networks and systems.

We needed to start at the basics and that was to define a common carrier or 'backbone' that would meet the hospitals total needs.

BROADBAND DISTRIBUTION SYSTEM

- *DESCRIPTION*

Broadband is a communication technique consisting of coaxial cable, a head end transceiver for receiving and transmitting information, amplifiers or signal boosters to maintain signal strength and tuners to isolate frequencies in multiples of 6 MHZ.

Technology of today can allow bandwidths up to 650 mhs. A TV channel for instance requires 6MHZ for transmission while an ethernet communications system operates at 10 MHZ and therefore requires 2 six MHZ channel one to transmit and one to receive.

In our opinion then it was obvious that a broadband distribution network would meet all of D. E. C. H.'s network requirements.

- DATA COMMUNICATIONS APPLICATIONS
  - CONNECTIVITY (LOCAL & REMOTE)
  - EXPANDABILITY
  - FLEXIBILITY

- LOCAL CONNECTIVITY
  - TERMINAL TO HOST
  - PC TO PC
  - PC TO HOST
  - HOST TO HOST

- REMOTE CONNECTIVITY
  - LABS
  - CLINICS
  - DOCTORS' OFFICES
  - REMOTE HOSPITALS
  - SATELLITES TO OTHER CITIES AND LOCATIONS

- EXPENDABILITY
  - USER DEVICES
  - COMPUTERS
  - DIFFERENT AREAS (DEPARTMENTS, FLOORS, BLDGS)

- FLEXIBILITY
  - EASILY RELOCATE EQUIPMENT
  - SUPPORTS VARIOUS DEVICES
  - SU[PPORTS PROPRIETARY AND STANDARD PROTOCOLS

- CLINICAL COMMUNICATIONS APPLICATIONS
  - ELECTRONIC IMAGE DELIVERY
  - AUDIO/VISUAL SUPPORT

- ELECTRONIC IMAGE DELIVERY
  - CAT SCAN
  - ULTRA SOUND (STORK STORY)
  - X-RAY
  - MAGNETIC RESONANCE IMAGING

- AUDIO-VISUAL SUPPORT
  - O/R TO LAB
  - O/R TO RADIOLOGY
  - DOCTORS' OFFICES TO LAB
  - DOCTORS' OFFICES TO RADIOLOGY

- SECURITY NETWORK APPLICATIONS
  - PATIENT MONITORING
  - AREA ACCESS

- PATIENT MONITORING
  - PATIENT ROOMS
  - PATIENT WARDS

- AREA ACCESS
  - RESTRICTED AREAS
  - EQUIPMENT
  - ENTRANCE/EXIT AND PARKING LOT

- PROFESSIONAL INFORMATION NETWORK APPLICATIONS
  - SATELLITE LINK
  - IN-HOUSE PROGRAMS

- SATELLITE LINK
  - HEALTH CHANNELS
  - CONFERENCE CHANNELS
  - EDUCATION CHANNELS
  - REMOTE FACILITIES AND DATABASES

- IN-HOUSE PROGRAMS
  - NEW PROCEDURES
  - STAFF DEVELOPMENT PROGRAMS
  - EDUCATIONAL PROGRAMS
  - O/R VIEWING FROM AUDITORIUM
  - INTRODUCTION TO NEW STAFF

- PATIENT INFORMATION NETWORK APPLICATIONS
  - PRESCRIPTION PROGRAMS
    - PATIENT INFORMATION ON SPECIFIC DISEASES
  - RELAXATION PROGRAMS
    - POST OPERATIVE REHABILITATION
  - NUTRITION AND DIETARY PROGRAMS
    - SELECT MEALS FROM MENU
  - GENERAL INFORMATION PROGRAMS
    - ADMISSION AND DISCHARGE PROCEDURES
    - HOSPITAL DIRECTORY
    - COMMUNITY INFORMATION

- PATIENT ENTERTAINMENT APPLICATIONS
  - CABLE TELEVISION
  - MOVIE RENTALS
  - VIDEO GAMES

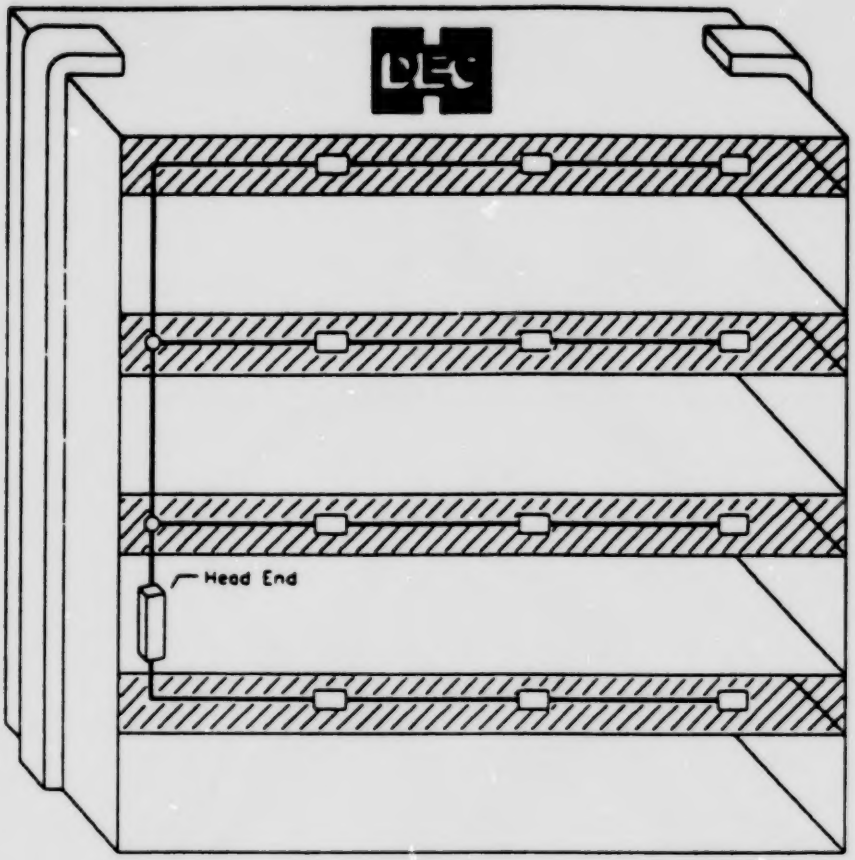
- *SUMMATION*

WITH ALL THIS TECHNOLOGY CHANGING DAILY AND VIRTUALLY BECOMING OVERWHELMING HOW DO WE MANAGE IT.

I would like to close with a story about a genius and a would be genius. Their names are not important.

The would be genius thought he would test the intelligence of the smarter man and proceeded to ask the genius a series of questions pertaining to specific world events and dates. The genius failed to answer any of them correctly.

The pompous would be genius quipped "..and you would call yourself a genius?" The other simply replied "My good man the answer to all those questions can easily be found in an encyclopedia. I choose not to clutter my mind with facts and figures, rather, I choose to use it to think.



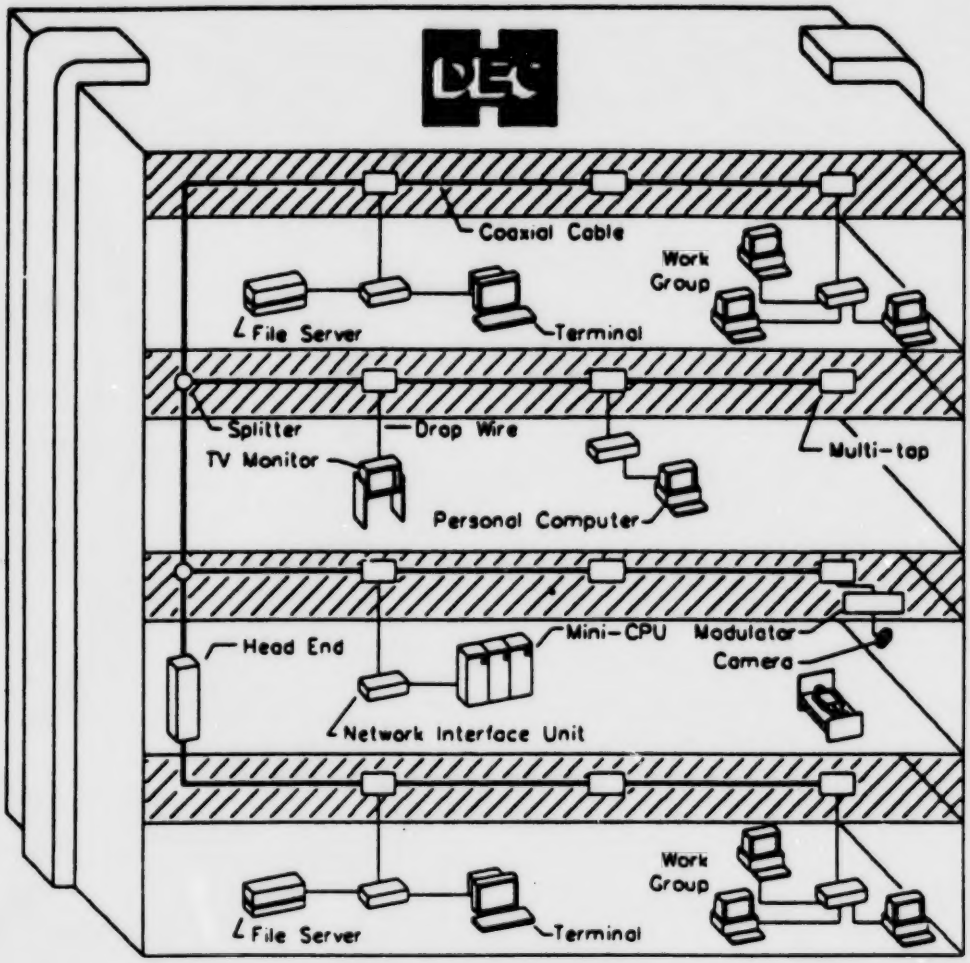
Broadband Distribution System

- Data Communications Network
- Clinical Communications Network
- Security Network
- Professional Information Network
- Patient Information Network
- Patient Entertainment Network

Data Communications

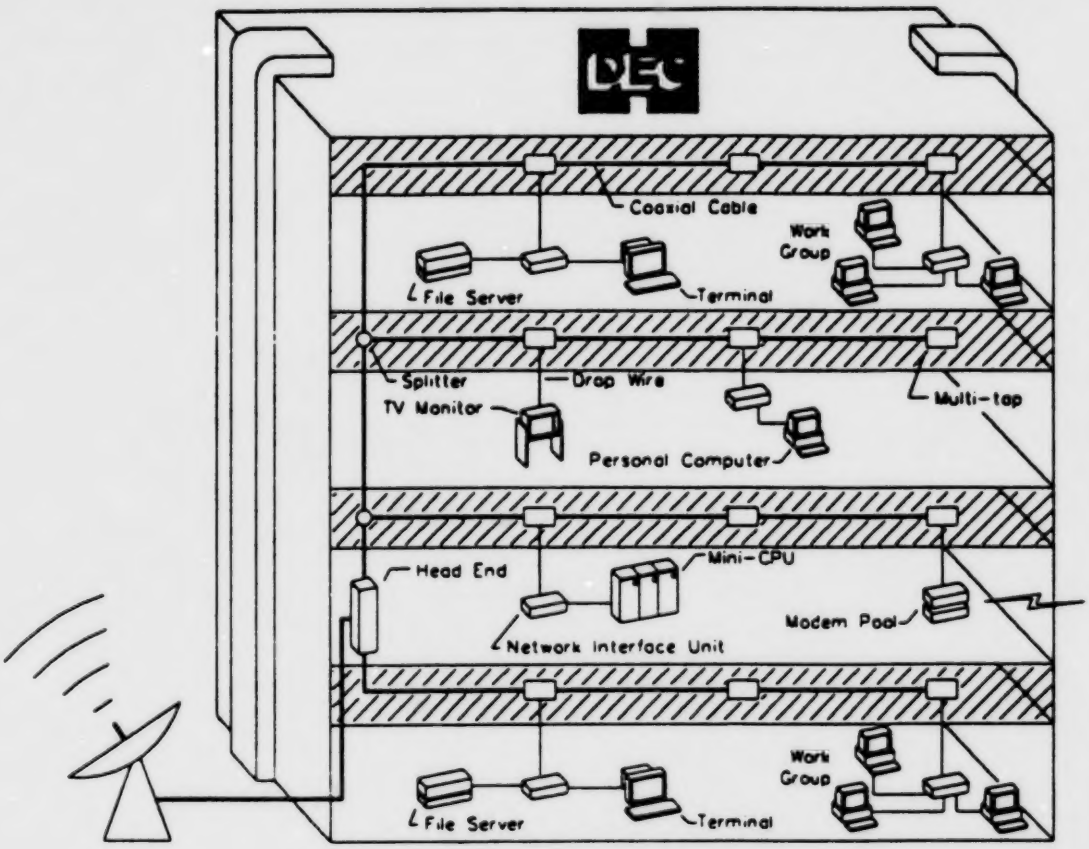
Applications

- Connectivity
- Expandability
- Flexibility



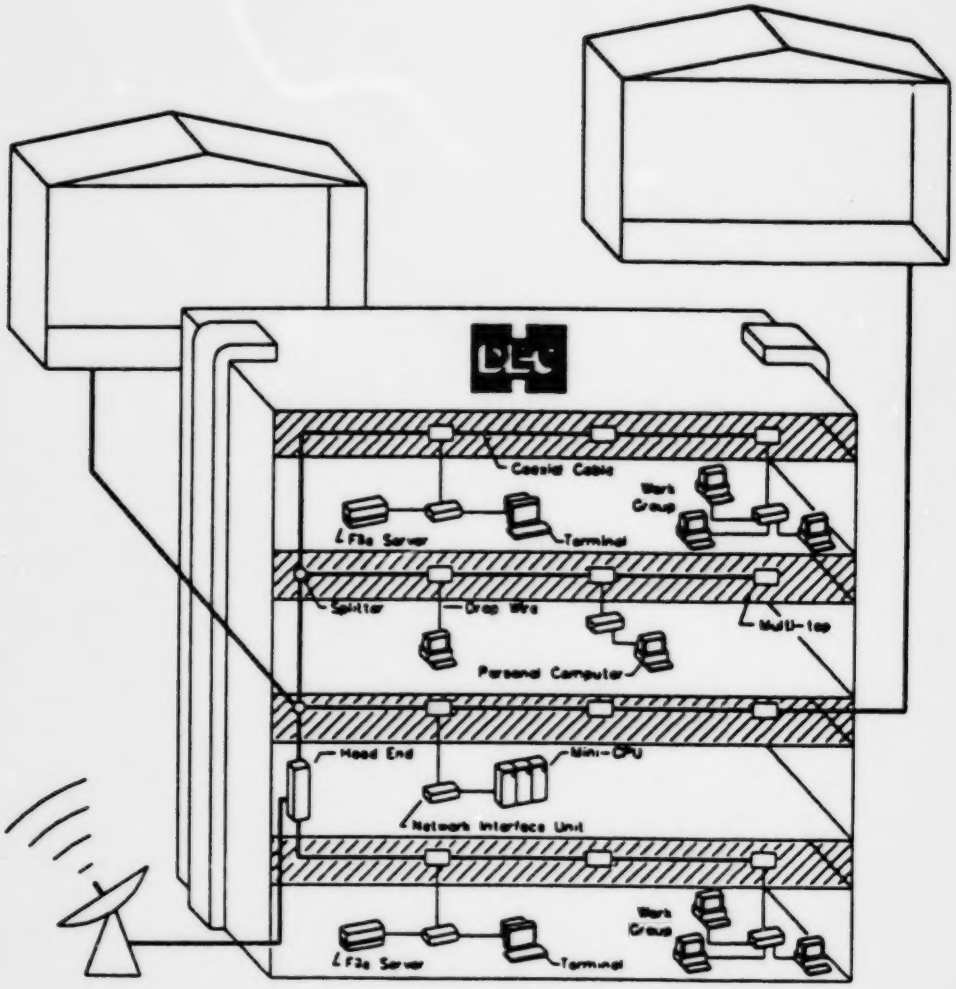
Local Connectivity

- Terminal to Host
- PC to PC
- PC to Host
- Host to Host



Remote Connectivity

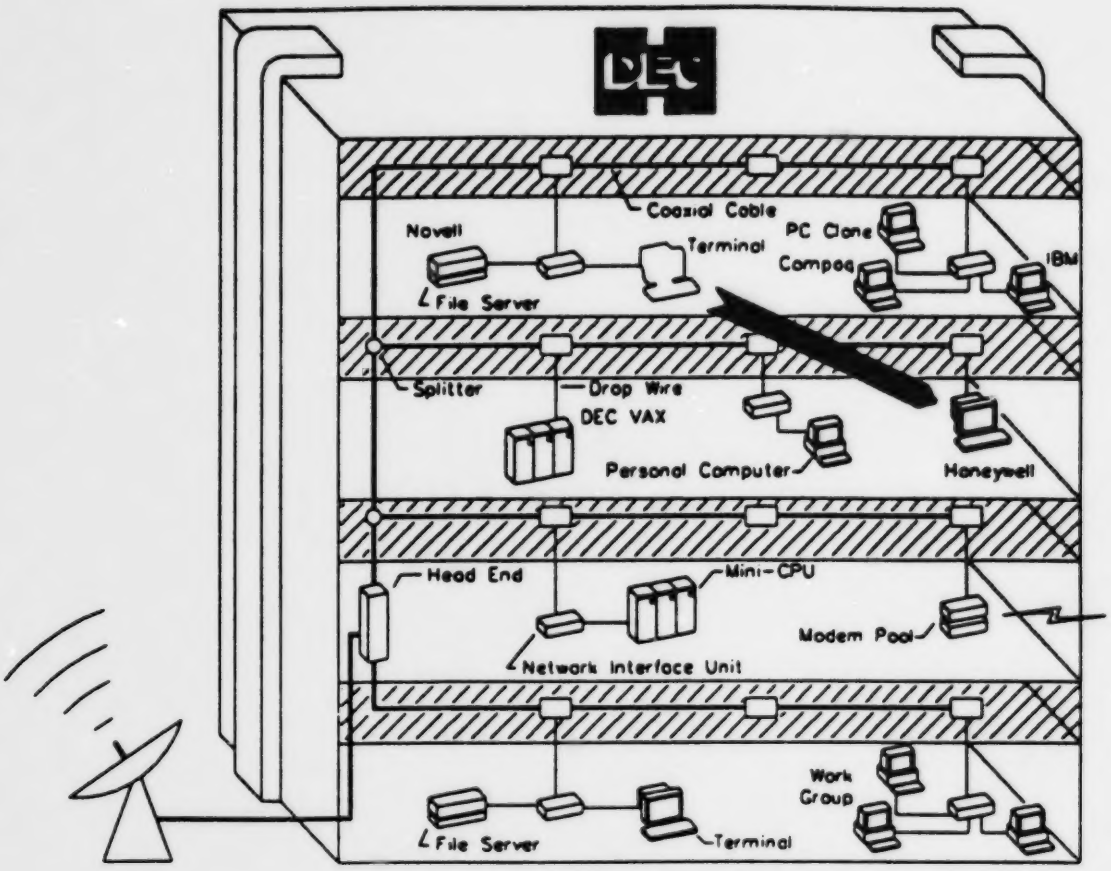
- Labs
- Clinics
- Doctors' Office
- Remote Hospitals
- Satellites to other cities and locations



Expandability

- User devices
- Computers
- Areas Covered

(Departments, Floors, Buildings)



Flexibility

- Moves and Changes

- Types of Devices
  Embossers
  Bar Code Readers
  Printers
  Personal Computers
  Laboratory Equipment

- Types of Protocols
  Proprietary and Standard

Clinical Communications

Applications

- Electronic Image Delivery
- Audio/Visual Support

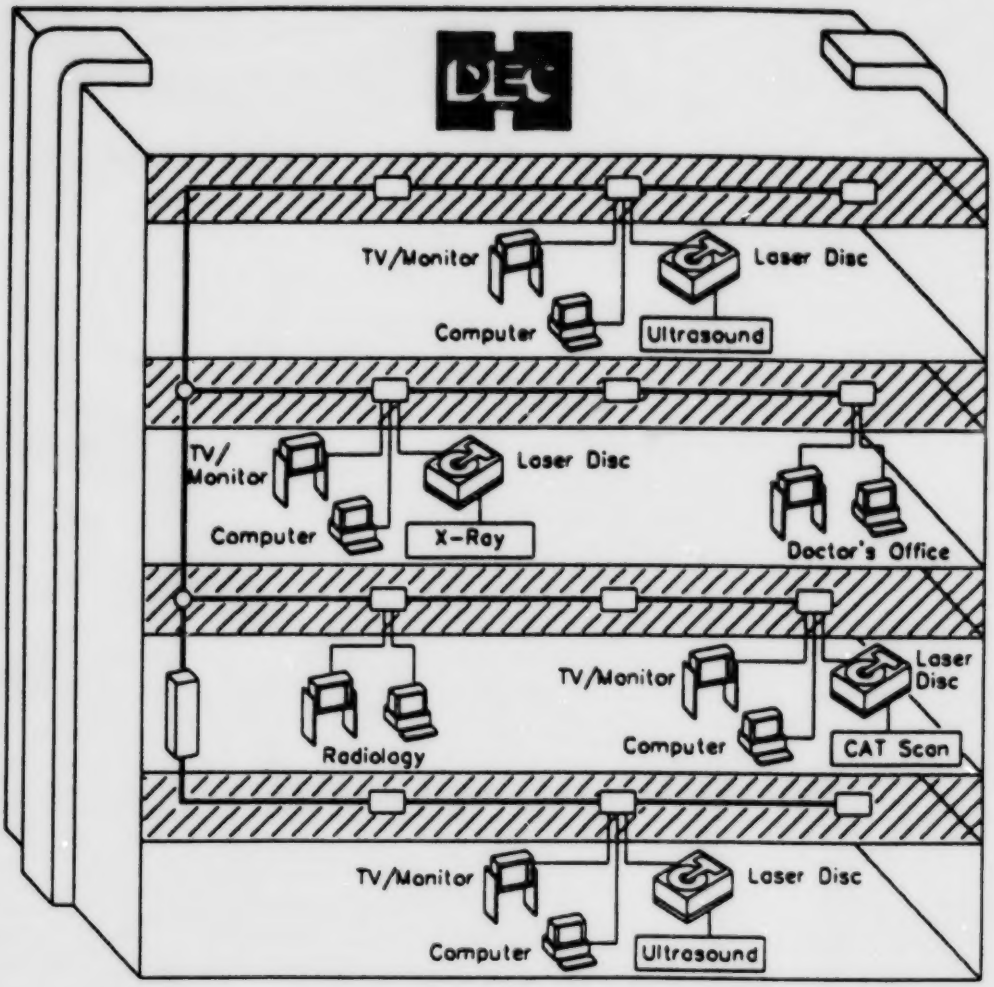
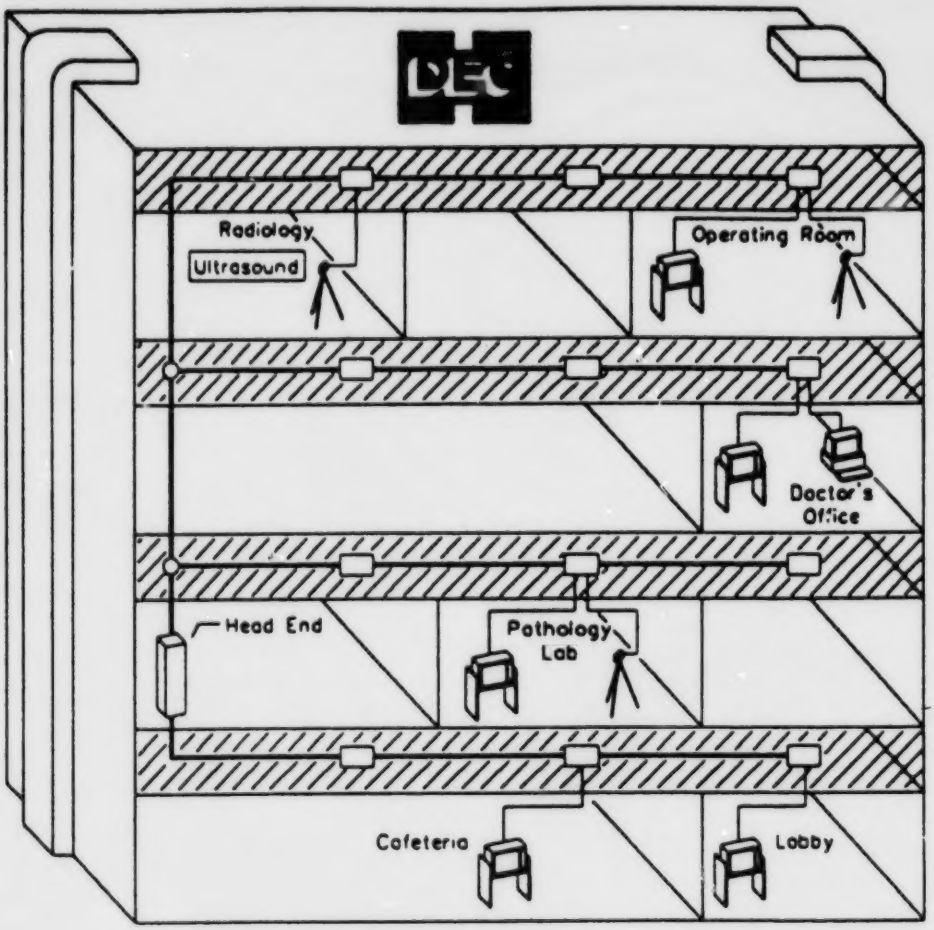


Image Delivery

- CAT Scan
- Ultra Sound
- X-Ray
- Magnetic Resonance Imaging



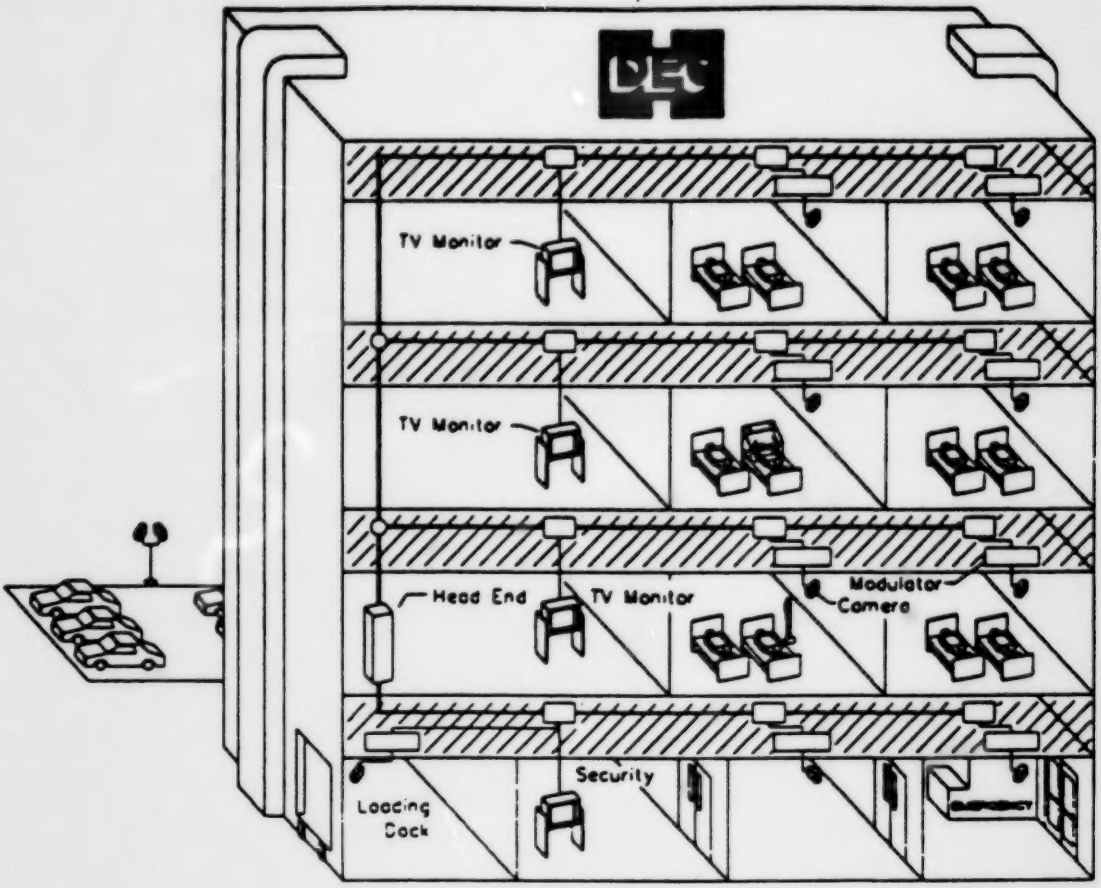
Audio-Visual Support

- Operating Room to Laboratory
- Operating Room to Radiology
- Doctor's Office to Laboratory
- Doctor's Office to Radiology
- Limitless Applications

Security Network

Applications

- Patient Monitoring
- Area Access



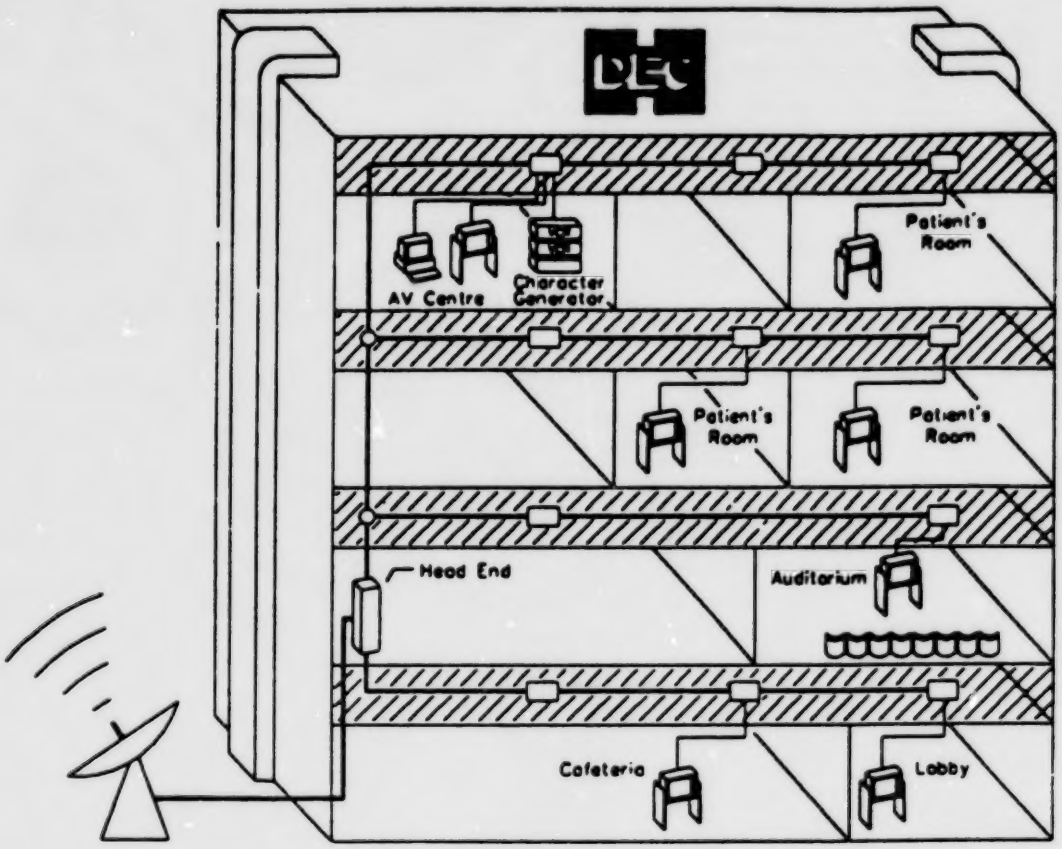
Security Network

- Patient Room Monitoring
- Patient Ward Monitoring
- Restricted Area Monitoring
- Entrance and Parking Monitoring
- Equipment Monitoring

Professional Information Network

Applications

- Satellite Link
- In-House Programs



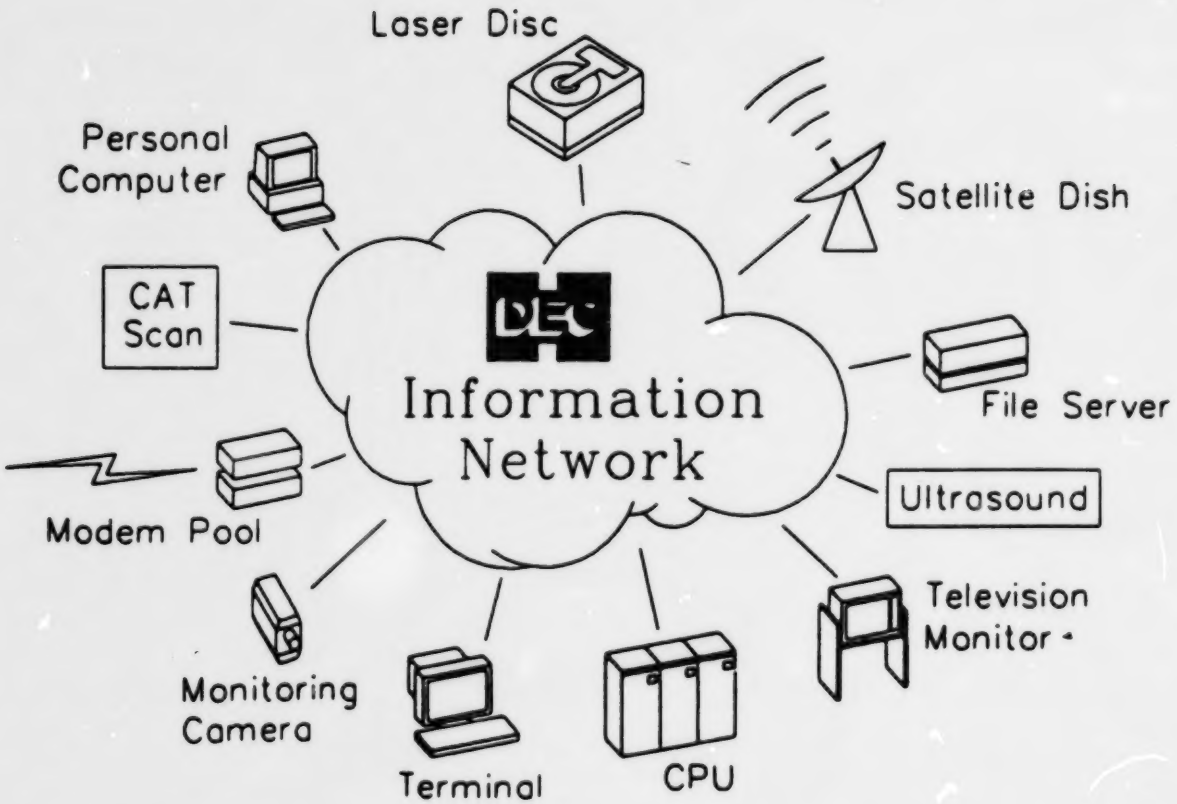
Professional Information Network

- Satellite Link too:

  Health Channels
  Conference Channels
  Educational Channels
  Remote Facilities

- In-House Programs

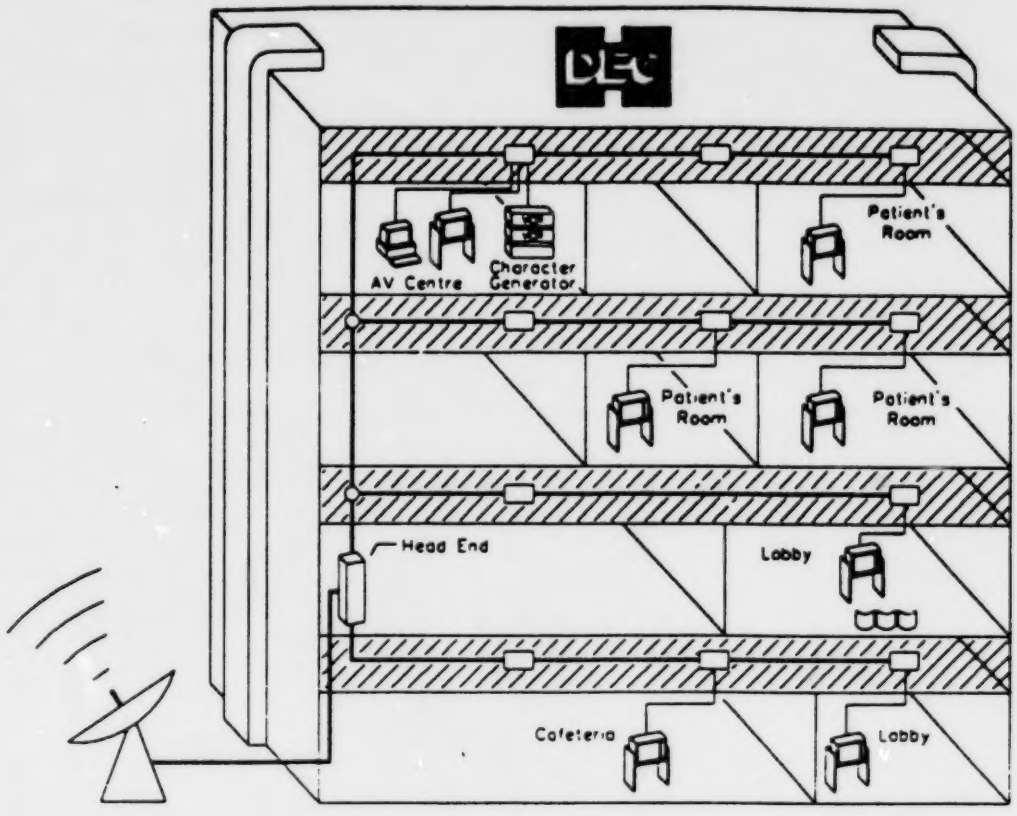
  New Procedures
  Staff Development Programs
  Educational Programs


Laser Disc
Personal Computer
Satellite Dish
CAT Scan
DEC
Information Network
File Server
Modem Pool
Ultrasound
Television Monitor
Monitoring Camera
Terminal
CPU

Patient Information Network

Applications

- Prescription Programs
- Relaxation Programs
- Nutrition and Diet Programs
- Information Programs



Patient Information Network

- Prescription Programs

  Patient Information on Disease

- Relaxation Programs

- Nutrition and Dietary Programs

- Information Programs

  Admission and Discharge Procedures
  Hospital Directory
  Community Information

Patient Entertainment Network

Applications

- Cable TV Access

INFORMATION TECHNOLOGY CONFERENCE

FREDERICTON INN MAY 24, 1989

LOCAL AREA NETWORKS

Strategic Considerations

by
Danny Keizer
Manager, Data Communications Services
Data Center Services
Department of Supply and Services

Local Area Networks

NB Government LANs,
Today & Tomorrow

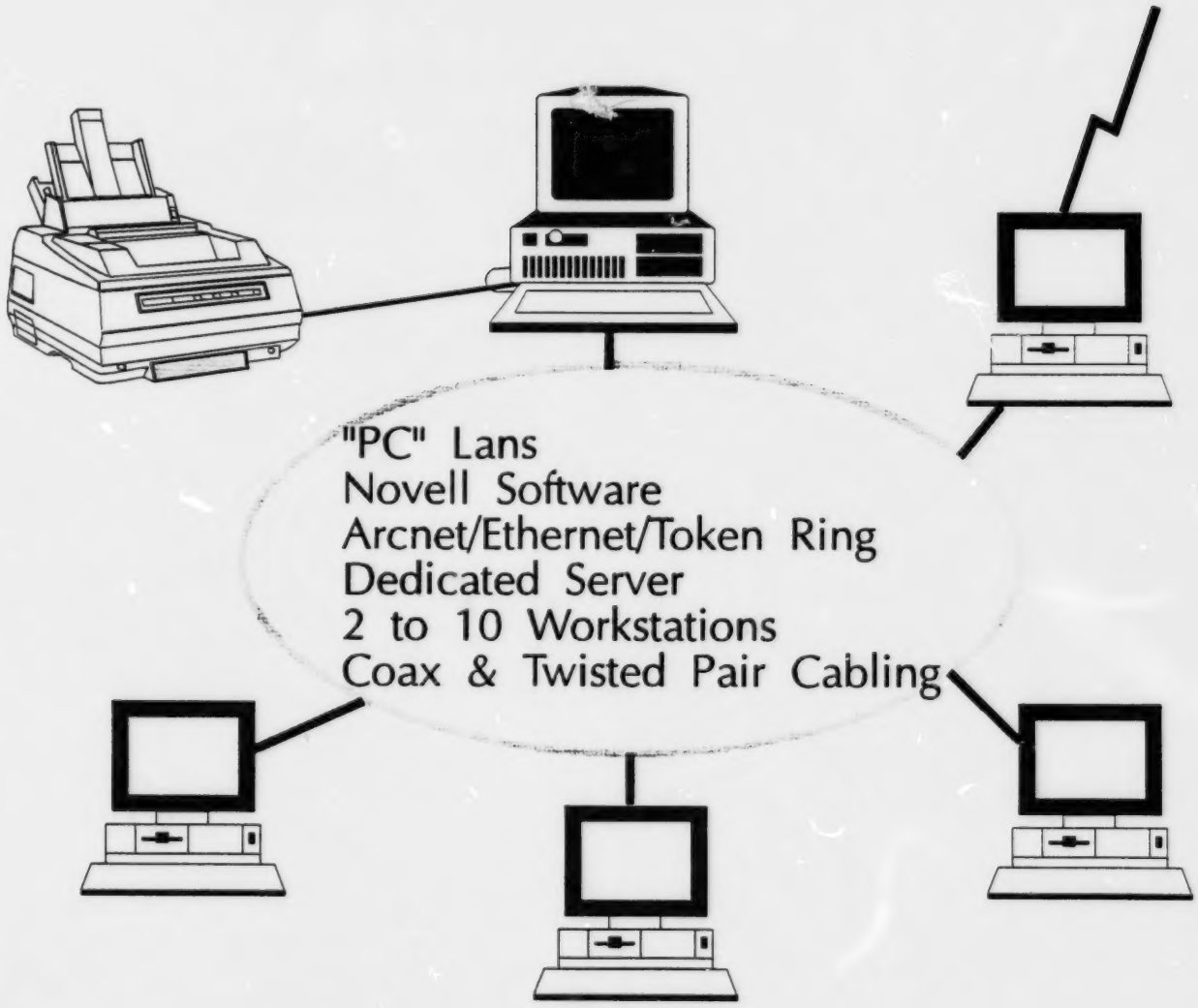
Benefits & Drawbacks

Planning & Implementation Issues

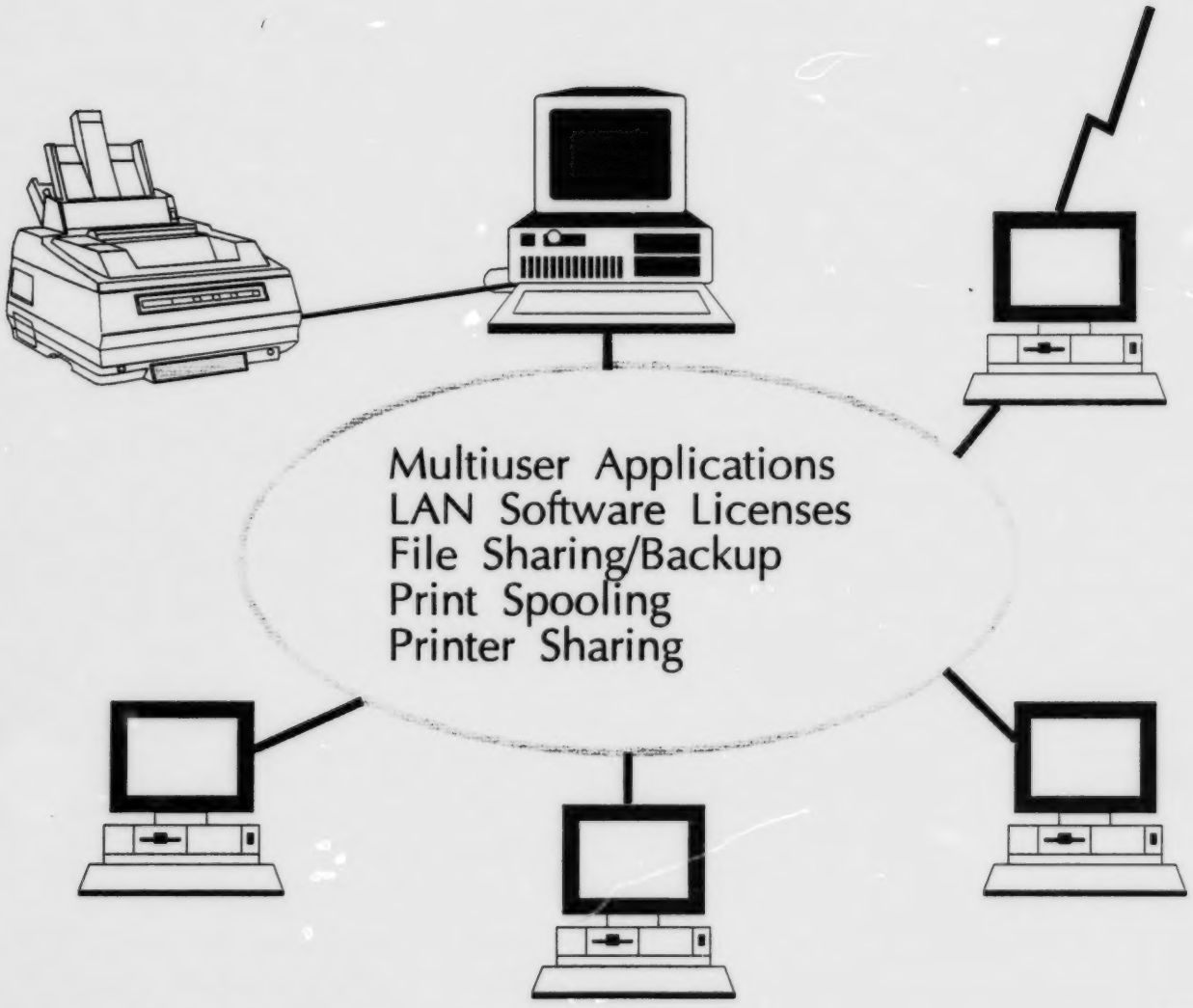
LAN Alternatives

Questions and/or Lunch

Today's NB Government LAN (Characteristics)

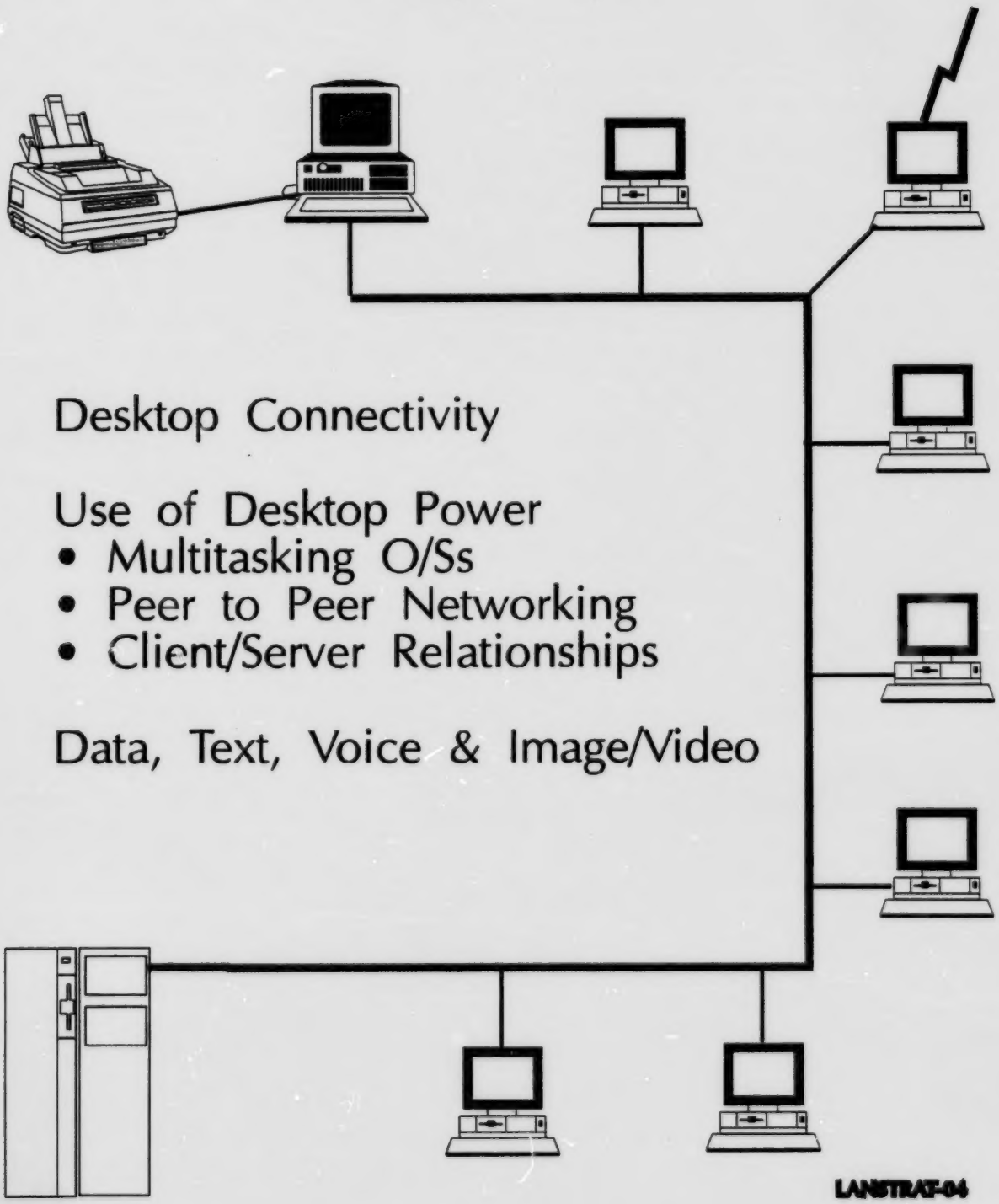


Today's NB Government LAN (Uses)



Today's NB Government LAN (Other Uses)

LANs, in the Industry Analyst's Eye



Desktop Connectivity

Use of Desktop Power
- Multitasking O/Ss
- Peer to Peer Networking
- Client/Server Relationships

Data, Text, Voice & Image/Video

LANSTRAT-04

Software Selection

Novell

- Stable
- Good Performance
- Popular
- Support Available
- Utilities & Add-ons
- Constantly Enhanced

Dual Standards

Ethernet/802.3

- Most Popular
- Mini/Mainframe Connections
- Fast

Token Ring/802.5

- Growing Market Share (#2)
- Popular Target for HW/SW
- Integrates well with IBM
- Supported by Other Vendors
- Works Well Over Twisted Pair
- Moderate to High Speed

Arcnet

- Good Performance
- Least Expensive
- Not Generally Recommended

Twisted Pair

- Ethernet - SynOptics LATTISNET
- Token Ring - IBM Cabling System
- ArcNet - Baluns
- Distance Limitations

Standard Cabling

- Ethernet - Thin or Thick Coax
- Token Ring - IBM Cabling System
- ArcNet - Coax
- Greater Distances

INFORMATION TECHNOLOGY CONFERENCE

FREDERICTON INN MAY 24, 1989

LOCAL AREA NETWORKS

Switches versus LAN

by
Rod Mills
Director, Networks and Office Systems
Data Center Services
Department of Supply and Services

LOCAL AREA NETWORKS

Switches versus LAN

TEXT NOT AVAILABLE AT TIME OF PUBLICATION

INFORMATION TECHNOLOGY CONFERENCE

FREDERICTON INN MAY 24, 1989

LOCAL AREA NETWORKS

Implementation Considerations

by
Jackie Cleveland
Manager, End-User Computing
Information Systems
Department of Transportation

LOCAL AREA NETWORKS

Implementation Considerations

TEXT NOT AVAILABLE AT TIME OF PUBLICATION

INFORMATION TECHNOLOGY CONFERENCE

FREDERICTON INN MAY 24, 1989

RIGHT TO INFORMATION ACT

by

Richard Burns
Director, Legal Services
Office of the Attorney General

RIGHT TO INFORMATION ACT

by
Richard Burns

TEXT NOT AVAILABLE AT TIME OF PUBLICATION

INFORMATION TECHNOLOGY CONFERENCE

FREDERICTON INN MAY 24, 1989

REVAMPING INFORMATION POLICIES

A Federal Approach

by

Peter Gillis
Group Chief, Information Practices
Treasury Board of Canada

TITLE:

REVAMPING INFORMATION POLICIES: A FEDERAL APPROACH

SPEAKER:

Peter Gillis
Treasury Board Secretariat

BIOGRAPHY

Mr. Gillis is a graduate in history from Trent and Queen's Universities. He began his working career with the Department of Lands and Forests in Ontario and in 1970 joined the Public Archives of Canada. Mr. Gillis held several positions in both the Manuscript and Government Archives Divisions ar the Archives. In 1980, he joined the Treasury Board Task Force on Access to Information and Privacy to develop privacy policies and in 1982 assumed policy development responsibility for both Acts. At present Mr. Gillis is Group Chief, Information Practices, in the Information Management Division of the Treasury Board. His current responsibilities include government policies in regard to the Access to Information and Privacy Acts, security and information management.

SUMMARY:

A new policy for the management of government information holdings is needed in the federal government as a result of the rapid developments in information technology and the erosion of central control mechanisms in government institutions for controlling an expending information base (only 50% of government information holdings is currently under control). In addition there is a need to more adequately meet the requirements of the Access to Information Act and the Privacy Act, which legally define the scope of the government's accountability for its information holdings and government requirements in regard to information collection and security. An appropriate solution for these problems is a corporate approach to information management based on a comprehensive administrative framework which takes account of all information holdings in government institutions regardless of the media on which the information is contained (paper, microfilm, machine-readable, etc.). Such a new policy, based on a corporate inventory, should have the object of ensuring that statutory and government policy requirements relating to information collection and creation, organization retrieval and use; access to information; privacy; security; retention; archival preservation and disposal of information are applied to government information holdings in a coordinated and effective way by establishing a system of accountability within institutions and across the government.

REVAMPING INFORMATION POLICIES

Quite frequently these days invitations cross my desk announcing lectures on the Chief Information Officer (CIO) and recommending my attendance to discover the CIO's role in defining and implementing solutions to modern managerial problems. I am fascinated by the concept of the CIO, especially the recommended salary band of $400 to $450,000. Fascination is, however, also tempered by concern as traditional management networks are turned on their heads. Will a new centralized information system prove as inflexible as older ones have been? Can effective corporate controls on information be maintained without alienating the program manager who must maintain ultimate responsibility for that information? Will a durable corporate record exist from emerging office technology and can an acceptable system be found to preserve archival or historical documentation of enduring value? Can societal issues of public access to government information and protection of privacy be adequately addressed in new information systems? Can the need for security measures to protect vital public and private interests expressed in the information be addressed and important rights guaranteed?

These are difficult questions. They have preoccupied the Information Management area in Treasury Board Secretariat since the late 1970's. I do not have definitive answers to any of them but I do wish to share with you the approach that the Secretariat is beginning to take to this important area of management.

BACKGROUND

The first crucial decision that we had to make was that most of our current policies in this area are obsolete. This was somewhat difficult to admit since the most recent policy, records management, dated only from 1983. Nevertheless, this policy had not covered machine-readable records and this left a considerable gap. As well, the reporting system built into it, by which the Dominion Archivist reports annually to the Secretary of the Treasury Board, was indicating that even in the area of traditional paper documents, the records manager was losing out to information management competitors in institutions and progress in implementation has been unacceptably slow. For the federal government the time for traditional solutions had passed. It was time to take a different approach. This decision coincided with the enactment in 1985 of a major recommendation of the federal Task Force on Informatics that a new Information Management Division be established within the Board. For the first time there exists an opportunity for information technology and information holdings to be treated in one policy framework. The results of this reappraisal is our proposal for a new Policy for the Management of Information Holdings.

For us, the issue is fundamentally one of brining information "under control" within government institutions. The Access to Information and Privacy Acts use the phrase "under the control of a government institution" to legally define the scope of the government's accountability for its information holdings. This requires the government to account for and describe its information holdings and ensure that all of the requirements of the two Acts are applied to the information itself. Similarly, the Security Policy, the Information Collection Policy, the Records Management Policy, Micrographics Policy, EDP: Data Management Policy and other Treasury Board information management policies require departments to have a system of accountability, in order to apply government-wide policies to their information holdings.

In any system for the effective management of information holdings there are five basic requirements. The first requirement is for departments to know, at the corporate level, what information is under their control. The second requirement, and perhaps the most important, is that corporate controls on information holdings are effective in providing, in a timely fashion, accurate, high quality information for decision-making by government officials and ensure the integrity of that information in documenting government programs. The third requirement is to have a management system under which responsibility is assigned for applying government-wide legal and policy requirements governing the collection, protection, access, use, retention and disposal of information. A fourth consideration is that government information of enduring historical or archival value is preserved to document government activities, protect public and private rights and to support cultural objectives relating to the study of national issues. The final consideration is that such corporate resource for the institution and for the government as a whole, resulting in cost-benefits by ensuring wider use.

The basic problem is that the first requirement has not been met. This has meant that the other objectives have not been effectively attained. Based on experience with the current Records Management Policy, we estimate that less than half of government records have been properly accounted for and organized for efficient reference and retrieval. Central control mechanisms, where they exist, are being eroded through the rapid growth of an information base oriented to new technologies such as the personal computer and, in any case, often only account separately for traditional paper files, microfilm, or machine readable holdings. There is doubt that information is being efficiently and effectively provided to officials in an integrated and complete form to support the conduct of government programs and corporate decision-making.

As well, the statutory requirement of the Access to Information Act to account for records has been met, in large part, by providing "conceptual" descriptions of classes of records which in many cases bear no relationship to actual blocks of files or data holdings. It should be noted that conceptual descriptions are not adequate for the purposes of the Act, which requires description "in sufficient detail to facilitate the exercise of the right of access."

An accurate inventory of information holdings at the corporate level is also the key to implementation of other government legislative and policy objectives concerning security practices, collection of data, controls over the use and disclosure of personal information and ensuring that archival requirements for the preservation of records of historical value apply to all information, regardless of the medium (e.g. machine readable, paper, microform) in which it is stored.

An essential cornerstone of any policy solution, therefore, is to take Treasury Board policy out of the traditional management for records (i.e. paper-based documents and files) and have it apply broadly to information, regardless of media. A new policy would impose few new requirements as such, but would have the objective of rationalizing the present structure to reflect the new approach to information management, to facilitate the implementation of statutory and policy requirements and to meet institutions' corporate needs.

POLICY FRAMEWORK

There is a need to establish a broad framework within which government institutions can carry out their information management activities in an efficient, effective, integrated and economical manner. The converging technologies of computers, telecommunications and other automated office support systems have combined with a rapidly growing government information base to make it obvious that the various information management functions can no longer be dealt with in isolation.

A coordinated and more comprehensive approach is necessary to strengthen corporate control mechanisms over all information holdings in government institutions and to ensure that such holdings are made available to officials of government institutions in support of corporate and management decision-making and the conduct of government programs. This approach is also vital in meeting government-wide requirements for ensuring the proper security and protection of government holdings, for meeting the provisions of the Access to Information and Private Acts, and for ensuring that information of enduring historical and archival is preserved.

To accomplish these objectives, current Records Management Policy (APM, Chapter 460); Records Management of EDP Data (APM, Chapter 440.7); and the appropriate records management directives in Micrographics Policy (APM, Chapter 445) will be superseded by a new policy on the Management of Government Information Holdings. The new policy will be based on the following principles that government institutions:

(a) shall ensure that they have in place a coordinated and comprehensive strategy for the collection, creation, organization, retrieval, efficient utilization, protection, retention and disposal or archival preservation of all their information holdings, regardless of media on which they are stored;

(b) shall establish and maintain a central directory and inventory of information holdings, organized through an approved classification system reflecting institutional programs and activities, which includes accurate descriptions of information in each office, division, branch or regional office. The inventory will aid in ensuring that such holdings are effectively managed

- to create and maintain information holdings in such a manner as to ensure the quality, relevance, integrity and currency of information to meet operational requirements;
- to organize information holdings to facilitate efficient retrieval for use within the government, or by the public;
- to assign accountability throughout government institutions for the application of all legal and policy requirements relating to the creation, collection, organization, access, retrieval, use, protection, preservation, retention and disposal of information under the control of institutions;
- to account for and describe government information holdings for purposes of the Access to Information and Privacy Acts;

- to protect information from unauthorized access, disclosure and alteration, and from deterioration and loss;

- to retain information only for as long as it is needed for operational requirements, to preserve information of enduring value and to dispose of information when it is no longer required;

- to facilitate wider use and eliminate unnecessary collection of information, subject to constraints such as those imposed by the Privacy Act, through maintenance of a clearinghouse function at institutional and government-wide levels;

- to conserve information of enduring historical and archival value;

- to meet requirements for productivity improvement in government institutions;

(c) shall appoint a senior official to have primary responsibility for managing the information holdings of the institution and for creating and maintaining the inventory, as well as for ensuring that the information policies, principles and standards of Treasury Board are implemented in the institution, for developing institutional policies and procedures to govern implementation and, for overseeing and reviewing activities for the management of information holdings;

(d) shall apply, when cost-beneficial, emerging technologies for the effective management of information holdings and provide for the appropriate training of staff and other measures to promote the efficient use of the human resources dedicated to this function;

(e) shall ensure information holdings are not destroyed or removed from the control of the Government of Canada except in accordance with the National Archives of Canada Act and that information designated as having archival and historical value is preserved in accordance with that Act.

CONCLUSION

In considering a new policy on the Management of Information Holdings, it has been necessary to undertake a difficult and, at times, heart-wrenching review on existing policies.

At the present time, the policies are organized partly by user community (e.g. the Records Management policy is geared for the Records Manager) and partly by function (e.g. the information collection policy is intended to cover all collection from the public, whether it is a statistical survey of administrative collection). The present organization tends to reinforce the isolation of each policy from other policies and consequently, the responsibility centres within departments (e.g. EDP Manager vs. Records Manager). While there will always be a need for some "media" or "methodology" policies for each specialty area, the question to be posed now is whether or not it would be more

appropriate to have much fewer "how to" policies in favour of a small number of "what" policies dealing with the broad requirements of corporate information management. Many current policy directives will survive as standards but not as all encompassing policy. More flexibility will be permitted to deputy heads of government institutions.

Some requirements for policy integration have already been indicated for a long time, such as the need for policies encompassing the converging technologies of EDP, telecommunications and word processing. Departments have been moving towards this for some time.

The user communities, the objectives they serve and the "Godfathers" or mother houses that watch over them (e.g. Treasury Board for EDP, Public Archives for records management) will all have to adjust to fairly radical new structures and, for the central agencies, advisory roles. Within a few years, it may be expected that these traditional management networks will be fundamentally altered as resource pressures and the introduction of new technological capability bring about a rationalization of information management activities across government. How this happens will depend on which groups, individuals or organizations succeed in making the transition from the EDP, record, book or survey business to the information business in its totality.

INFORMATION TECHNOLOGY CONFERENCE

FREDERICTON INN MAY 24, 1989

RELATIONAL DATABASES

I B M Products

by
William R. Graber
Consulting Systems Engineer
I B M Canada

Information

Technology Conference

New Brunswick

Government

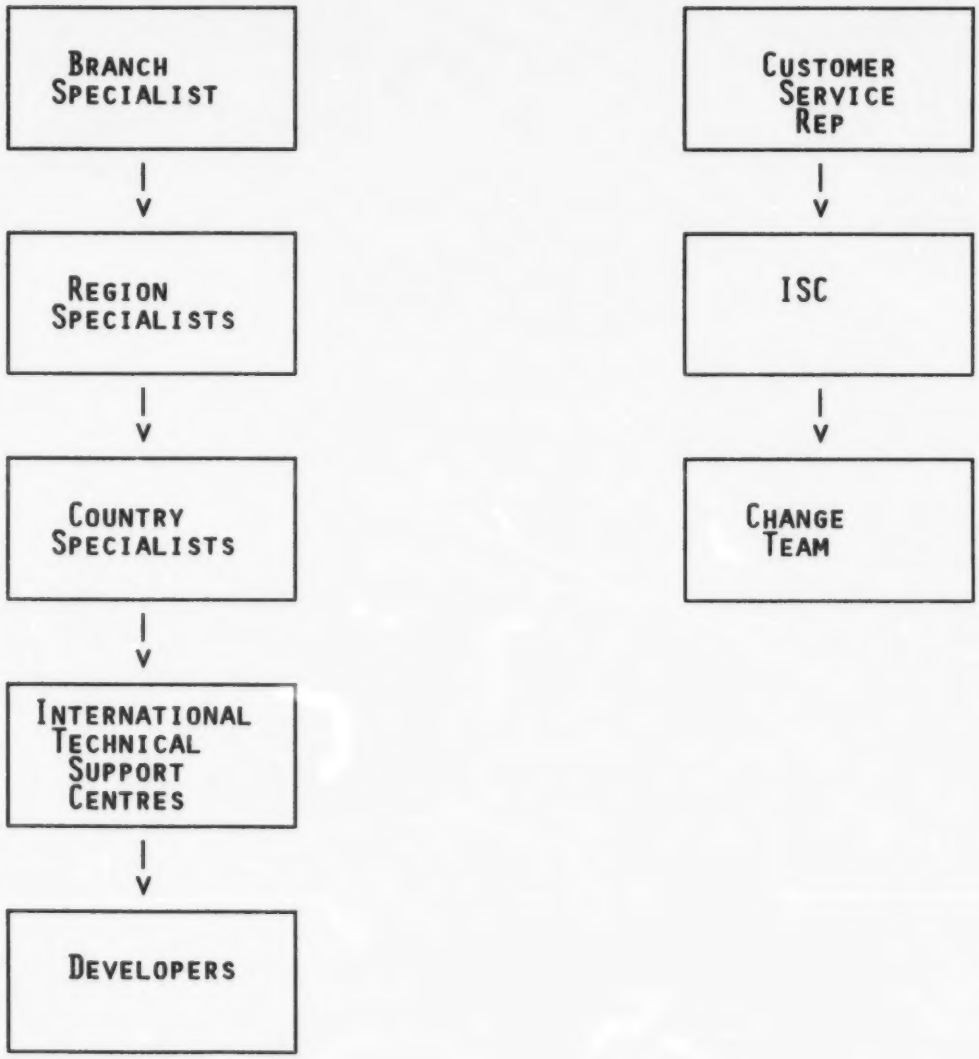
IBM Relational

Product Family

William R. Graber
Consulting Systems Engineer - IBM Canada
Central / Atlantic Region FSC

Wednesday, May 24, 1989

Relational Support



Agenda

- IBM Relational Databases
- Relational Product Family
- Systems Application Architecture
- Distributed Relational Data
- DB2

  Releases
  Content - Referential Integrity
  Features - Industrial Strength
  Performance
  MVS / ESA
  Usage

- Application Development Environment

Available Relational DBMS

- History
- Implementation of the Relational Model
  Consistency Across all Environments
- MVS - DB2
- VM - SQL/DS
- AS/400

  Integrated Relational Database Manager
  Part of the Operating System/400
  SQL/400

- PS/2 - Operating System/2 Extended Edition

  Relational Database Manager
  SQL Interface
  Integrated Query Manager

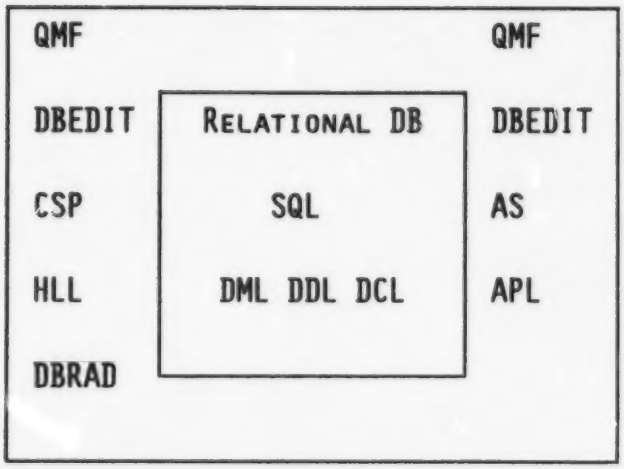
Relational Product Family

Operational

* Interactive Development
* HLL
* 4 GL
* Report Writers
* Interactive Dictionary

Decision Support

* APL Interface
* Statistics
* Financial Planning
* Graphics
* Project Mgmt
* Query
* 5 GL
* Mini Applications



History

RELEASE / VERSION	ANNOUNCE-MENT	AVAIL-ABILITY
Release 1	2Q 1983	2Q 1985
Release 2	1Q 1986	2Q 1986
Release 3	2Q 1987	3Q 1987
Ver 2 R 1	2Q 1988	4Q 1988
Ver 2 R 2	4Q 1988	3Q 1989

History ...

RELEASE / VERSION	FUNCTION	EASE OF USE	PERFORM-ANCE
Release 1	X	X	
Release 2			X
Release 3	X	X	
Ver 2 R 1	X	X	X
Ver 2 R 2	X		

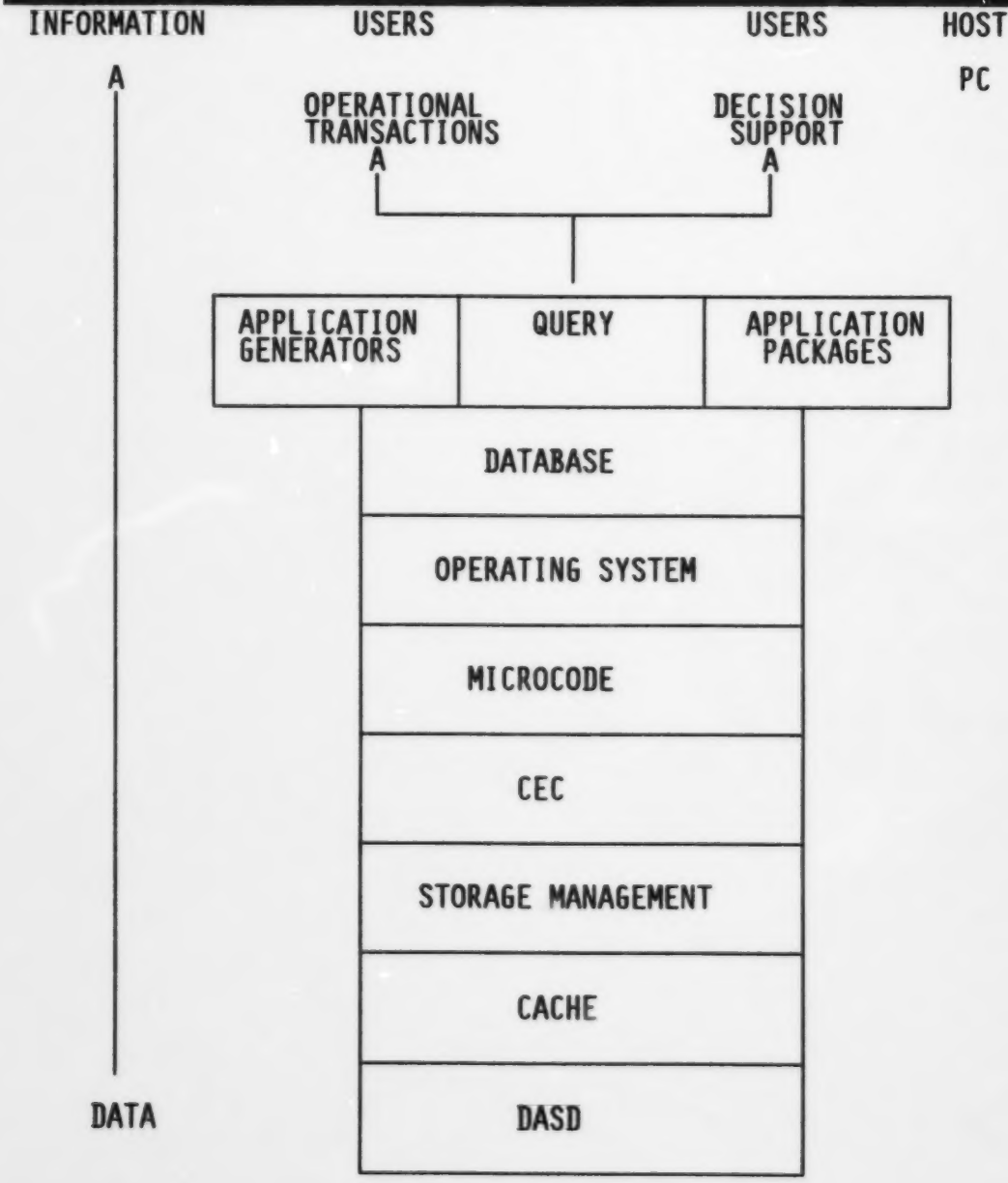
DB2 Industrial Strength

- Performance across the Usage Spectrum - Transaction Processing, Query
- Transaction Monitoring Facilities / Tuning Facilities
- Transaction Integrity - 2 Phase Commit
- Governor
- Comprehensive Authorization and Security
- Auditing
- Backup,Logging, Recovery/Restart

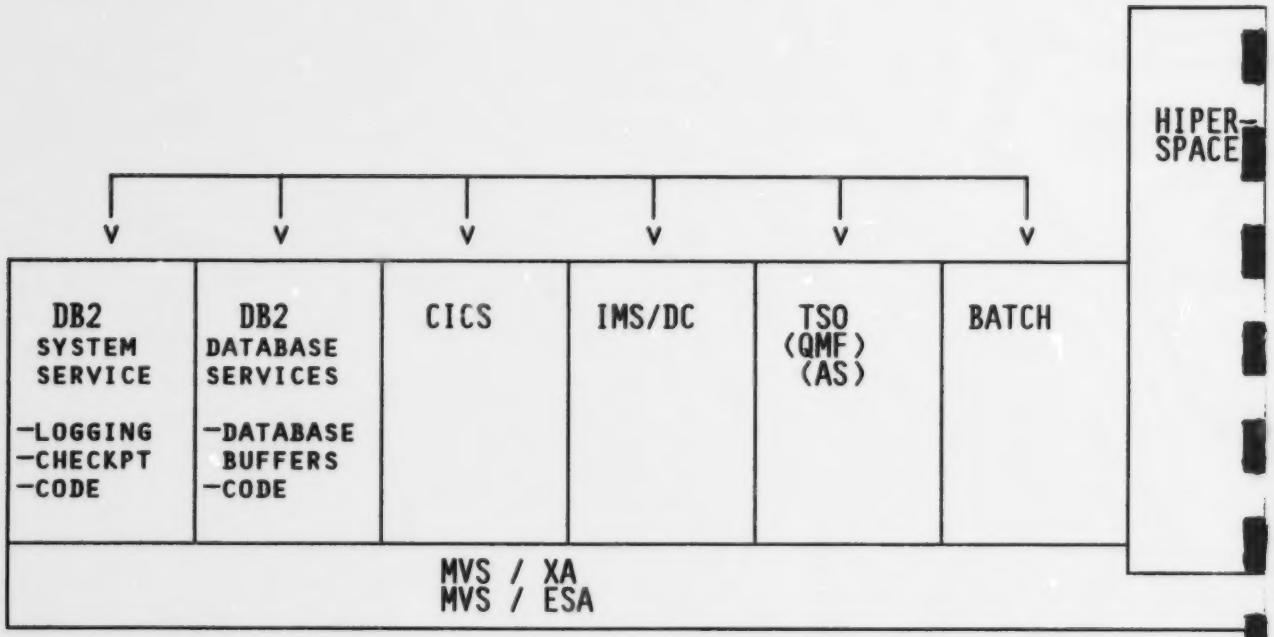
DB2 Performance

RELEASE / VERSION	HOT	COOL
Release 1 XA	1.7	2.4
Release 2 XA	1.4	1.8
Release 3 XA	1.3	1.7
Version 2 XA	1.1	1.4
Ver 2 R1 ESA	0.9	1.2
Ver 2 R2 ESA		

Operating Environment



DB2 Architecture



- X-Memory Services
- Virtual Storage Exploitation
- Expanded Storage Utilization
- N-Way Processor Utilization

INFORMATION TECHNOLOGY CONFERENCE

FREDERICTON INN MAY 24, 1989

RELATIONAL DATABASES

ORACLE Products

by

Larry Fitzpatrick
Representative
Computertime

FULL DOCUMENTATION FOLDERS ON HAND AT CONFERENCE

INFORMATION TECHNOLOGY CONFERENCE

FREDERICTON INN MAY 24, 1989

RELATIONAL DATABASES

THE PACE DATABASE

by

Bernie Sloan
Branch Support Manager
Wang Canada Inc.

DOCUMENTATION NOT AVAILABLE AT TIME OF PUBLICATION

INFORMATION TECHNOLOGY CONFERENCE

FREDERICTON INN MAY 24, 1989

RELATIONAL DATABASES

RDMS AND LINK PRODUCTS

by

Rod Millar
Director,Customer Support
UNISYS Canada Inc.

DOCUMENTATION NOT AVAILABLE AT TIME OF PUBLICATION

INFORMATION TECHNOLOGY CONFERENCE

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CLOSING COMMENTS

by
Grant MacLeod
Manager, Information Systems
New Brunswick Housing Corporation

INFORMATION TECHNOLOGY CONFERENCE

CLOSING REMARKS

BY GRANT MacLEOD

As a member of the Planning Committee for this 7th Technology conference, I look back over the months of planning and coordination that went into it all. I can't help but feel a certain sense of sadness now that it's all over.

That feeling quickly passes though when I realize what a success this conference has been. It is one of the largest turnouts for a Technology Conference we have had yet.

N. B. Housing has been attending these conferences for some time now but this is the first time anybody from N. B. Housing has actively participated in the Conference. When a volunteer was needed for the conference planning committee, we were more than happy to help out. Hopefully it won't be the last.

There are many people who have contributed to the success of this Conference. I would like to take a few moments to recognize them and thank them for their efforts.

On behalf of the planning committee and everyone here today, I would like to thank Mr. Max Lewis and Mr. Jerrie Fowler. I know these two gentlemen have been enthusiastic supporters of the Technology Conferences in the past and their support of this conference is much appreciated.

The speakers we had today deserve special mention. All were excellent and I hope everybody learned as much from them as I did.
Assistance with the audio equipment was provided by Bob Wade

Over the last few months, I have had the privilege of working with a dedicated group of people on the Planning Committee. My personal thanks to Bill Brydges, Tom Parker and Andre Gauthier. It was fun guys, we'll have to do it again sometime!

The next conference will take place sometime this fall and volunteers will be needed shortly to help out on the next planning committee. Anybody who wants to make some new friends, meet some new people (perhaps et your picture taken or your name in print) and s willing to commit a few hours of their time to a good cause is encouraged to contact Andre Gauthier within the next couple of weeks.

One of the experiments we are trying with this conference is the off-site demos which will be taking place over the next few days. I'd like to remind everyone who has signed up for a demo to check your schedule as it tells you the time and location for each demo you signed up for.

On the topic of experiments, we would like to hear from you how the one day conference format and the off-site demos have been received. As well, I'm sure Andre would appreciate any suggestions, comments,criticisms or ideas for future conferences.

In closing, I would like to thank all of you for attending today. This is your conference and I hope you found it beneficial. If I don't see you in the meantime have a good summer and I'll see you at the Fall Conference. Thank you.

INFORMATION TECHNOLOGY CONFERENCE

FREDERICTON INN MAY 24, 1989

APPENDICES

To all participants:

On behalf of the planning committee and the Information Services Group of the Department of Supply and Services, welcome to the seventh Information Technology Conference.

The theme of this Conference is Users' Choices of Selected Informatics. The presentations scheduled will focus on popular topics chosen by the community during our recent survey.

We believe this conference will be useful to many departments and would hope that a great number can profit from its contents.

Please note that the demos usually seen at the Conference have being scheduled during the next few weeks specifically for those who have expressed an interest in the sessions offered. Dates and times are itemized in your handout.

Thank you for your support and participation.

Thomas Parker,
Conference Chairperson

À tous les participant(e)s :

Au nom du comité organisateur et du Groupe des services d'information du ministère Approvisionnement et Services, je vous souhaite la bienvenue à la septième Conférence sur l'information technologique du gouvernement.

Cette conférence a comme thème principal Choix sélectifs des usagers en informatique récente. Les présentations porteront sur les sujets d'intérêt populaire déterminés par notre dernier recensement.

Nous croyons que cette Conférence sera utile à tous les ministères et espérons qu'un grand nombre saura en profiter.

Veuillez noter que les démos, normalement présentées à la conférence même, ont été cédulées durant les prochaines semaines spécialement pour ceux qui ont exprimé un intérêt dans les sujets offerts. Cette cédule fait partie de la documentation ci-jointe.

Merci de votre support et de votre participation.

Thomas Parker
Président de la conférence

NEW BRUNSWICK GOVERNMENT
INFORMATION TECHNOLOGY CONFERENCE

Wednesday, May 24, 1989

AGENDA

08:00	REGISTRATION	
08:30	WELCOME TO THE CONFERENCE Thomas Parker, Conference Chairperson	
08:40	INTRODUCTION TO THE CONFERENCE Jerrie Fowler, Assistant Deputy Minister, Information Services Group, Supply & Services	
08:55	ARTIFICIAL INTELLIGENCE Bradford G. Nickerson, Ph.D.,P.Eng., University of New Brunswick	
09:30	UNIX EXPLORED Professor John DeDourek, BS, MS, University of New Brunswick	
10:15	COFFEE BREAK	
10:30	POSSIBILITIES OF A BROADBAND NETWORK D. J. (Mick) Campisano, Manager, Information Systems, Dr. Everett Chalmers Hospital	
11:00	LOCAL AREA NETWORKS Danny Keizer, Manager, Data Communications Services, Data Center Rod Mills, Director, Networks and Office Systems, Data Center Jackie Cleveland, Manager, End-User Computing, Transportation	
12:15	LUNCH	
13:00	RIGHT TO INFORMATION ACT Richard Burns, Director, Legal Services, Office of the Attorney General	
13:35	FEDERAL INFORMATION MANAGEMENT POLICIES Peter Gillis, Group Chief, Information Practices, Treasury Board of Canada	
14:15	COFFEE BREAK	
14:30	RELATIONAL DATABASES AND 4GLS Bill Graber, Consulting Systems Engineer , I B M Larry Fitzpatrick, Marketing Representative, COMPUTERTIME Bernie Sloan, Branch Support Manager, WANG CANADA INC Rod Millar, Director, Customer Support, UNISYS CANADA INC	 on DBII on ORACLE on PACE on RDMS and LINK
16:45	CLOSING COMMENTS Grant MacLeod, Manager, Information Systems, New Bunswick Housing Corporation	

Français au verso

CONFÉRENCE SUR LA TECHNOLOGIE INFORMATIQUE DU GOUVERNEMENT DU NOUVEAU-BRUNSWICK

le mercredi 24 mai 1989

ORDRE DU JOUR

08:00	INSCRIPTION	
08:30	INTRODUCTION A LA CONFÉRENCE Thomas Parker, Président de la conférence	
08:40	INTRODUCTION A LA CONFÉRENCE Jerrie Fowler, Sous-ministre adjoint, Services d'information, Approvisionnement et Services	
08:55	L'INTELLIGENCE ARTIFICIELLE Bradford G. Nickerson, Ph.D.,P.Eng., Université du Nouveau-Brunswick	
09:30	UNIX EXPLORÉ Professeur John DeDourek, BS, MS, Université du Nouveau-Brunswick	
10:15	PAUSE-CAFÉ	
10:30	LES POSSIBILITÉS D'UN RÉSEAU *A BANDE LARGE* D. J. (Mick) Campisano, Gérant, Systèmes Informatiques, l'hopital Dr. Everett Chalmers	
11:00	RÉSEAU DE COMMUNICATION LOCAL Danny Keizer, Gérant, Communications en réseau, Centre de données Rod Mills, Directeur, Réseaux et systèmes administratifs, Centre de données Jackie Cleveland, Gérante, Services informatiques aux usagers, ministère des Transports	
12:15	DÉJEUNER	
13:00	SUR LE DROIT A L'INFORMATION Richard Burns, Directeur, Services juridiques, Cabinet du Procureur général	
13:35	LES POLITIQUES FÉDÉRALES SUR LA CONSERVATION DE L'INFORMATION Peter Gillis, Chef de groupe, Conseil du Trésor du Canada	
14:15	PAUSE-CAFÉ	
14:30	BANQUES DE DONNÉES RELATIONELLES ET LANGAGES 4^{e} GÉNÉRATION Bill Graber, Informaticien consultant, I B M Larry Fitzpatrick, Représentant, COMPUTERTIME Bernie Sloan, Gérant, Support à la clientèle, WANG CANADA INC. Rod Millar, Directeur, Support à la clientèle, UNISYS CANADA INC.	 sur *DBII* sur *ORACLE* sur *PACE* sur *RDMS* et *LINK*
16:45	COMMENTAIRES DE FERMETURE Grant MacLeod, Gérant, Systèmes Informatiques, Société d'habitation du Nouveau-Brunswick	

English on overleaf

INFORMATION TECHNOLOGY CONFERENCE

PRE-SCHEDULED DEMOS

Your responses to the pre-scheduled demos have been most encouraging, and we thank you for your support. The following demos have been volunteered and scheduled specifically for the people who have registered, and will be held at the user's site at the time and place specified below.

Due to the number of responses received on many topics, we have had to arrange several demos in some cases and have tried to distribute the participants as evenly as possible. This will allow you more individual attention. If you have expressed interest in attending a demo, please try to attend the one you were scheduled for. If you cannot, please arrange a substitution with one of the players on your list.

TOPIC Location	DESCRIPTION
Styles Checkers in use at Health Charles McKendy 453-2279 Health & Community Services 3rd floor, Carleton Place May 25, 01:15, 02:15 and 03:15 PM	Tools used in Health to evaluate writing styles, useful for reports and letters.
LAN Presentation and Data Centre Tour Peter Jacobs 453-4573 UNB Computer Center, Head Hall (access from Windsor st. parking) May 26, 9:00, 10:30, and 13:30	UNB will give a presentation and demo of two Local Area Networks including the JANET microcomputer network and the campus-wide broadband network, followed by a tour of their Data Center.
Sharing devices with SWITCHES Rod Mills 453-7413 613, Centennial Building May 29, 08:30 and 10:15 AM	Use of a SWITCH as a small network installed at the Centennial building by the ISG Networks and Office Systems.
Forms, Fonts and Utilities for LaserJet II Charlie Chiasson 453-2422 423, King Tower, King's Place May 30, 9:00, 10:00, and 11:00 AM	Menu driven selection of standard fonts suggested by the ISG Technology Transfer group.
Marysville Data Center Services Gary Andrews 453-2455 2nd floor north, Marysville Place June 1, 9:00 and 10:30 AM	Tour of the Marysville Data Center in small groups.
Computer Aided Design Ken Floyd 453-2155 H. J. Flemming Forestry Complex Boardroom 222 June 2 9:00 AM Cancelled due to Job Action	The New Brunswick Department of Education has been conducting CAD, CAM, and Robotics field test projects as part of technology in education for curriculum. Material is designed, prepared, and submitted by instructors and students. Full functionality in each site is acheived by using extremely flexible software, personal computers, a variety of operator programmable external machines for plotting and milling, and pre- and post-processors.

INFORMATION TECHNOLOGY CONFERENCE

PRE-SCHEDULED DEMOS

CAM Tools and Communications facilities
Ken Floyd 453-2155
H. J. Flemming Forestry Complex
Boardroom 222
June 2, 9:30 AM

Cancelled due to Job Action

Support for each site in the field study area is given by the Department own communications system, NEWBED. The communication system supports messaging, bulletin delivery and file transfer capability of all types. Files to support the operations are transferred to NEWBED from sites by modem and stored files become a valuable resource database for other sites working in a similar manner.

Electronic Control techniques and Basic ROBOTICS principles
Ken Floyd 453-2155
H. J. Flemming Forestry Complex
Boardroom 222
June 2, 10:30 AM

Cancelled due to Job Action

The department has recently begun to develop microelectronic and robotic control sites as well. There has been a variety of user defined applications developed as low as the Grade 7 level.

While material is directed toward education andmay be presented at level consistient with appropriate student age groupings, each department may find the methodology and applications pertain to various sections of technology transfer.

French Characters available on the UNISYS mainframe
Don McDonald 453-2422
287, York Tower, King's Place
June 5, at 08:45 and 10:00 AM

Enter, store and retrieve french characters between UNISYS mainframe and a microcomputer.

N.B. Inquiry Data System in use at the ISG Communications division.
Marie-Ange Levesque 453-2520
G51, Centennial Building
June 7, at 09:00 AM

Online data bank available for phone or walk-in inquiries, including the NBG telephone directory. System includes reports and booking facilities of board rooms in the Centennial building.

Videoshow Presentation Graphics facilities available at the ISG Access Center
Bob Sweet 453-3807
G51, Centennial Building
June 9, at 14:30

Creation of charts and slides using microcomupter based software.

Data Encryption tools and techniques
Professor Rod Cooper 453-4566
UNB, Computer Science Center
E128, Gillin Hall (access from Windsor st.)
June 12, at 2:00 PM (14:00 hrs)

Technically oriented discussion on, and demo of data encryption by Rod Cooper of the University of New Brunswick.

Communications Design facilities using MacIntosh Desktop Publishing
Dave Hemming 453-7178
G70, Centennial Building
June 14, 9:00 and 10:30 AM

Including form design, forms control, publishing methodology.

INFORMATION SYSTEM COORDINATORS
COORDINATEURS DE SYSTEMES INFORMATIQUES
NOVEMBER 1988 - NOVEMBRE 1988

DEPARTMENT MINISTERE	COORDINATOR COORDINATEUR	'PHONE
Advanced Education and Training Enseignement Supérieur et Formation	Bill Waugh	-2479
Agriculture	David Cowperthwaite	-5457
Alcohol & Drug Dependency Commission Comm. de l'Alcoholisme et Pharmacodépendance	Ted Hudson	-2136
Board of Management Conseil de Gestion	Jack Hermiston	-3835
Commerce and Technology Commerce et Technologie	Gary Fraser	-2474
Education - Éducation	Gordon Scott	-2785
Executive Council Bureau du Conseil Exécutif	Rick Phillips	-2286
Finance	Barry O'Donnell	-2708
Fisheries and Aquaculture Pêches et Aquaculture	Diane Nadeau-Harmon	-2251
Health and Community Services Santé et Services Communautaires	Jean-Claude Haché	-2279
Income Assistance - Aide au Revenu	Tony Ratliffe	-2882
Justice	Dianne Kelly	-3693
Labour - Travail	Stuart Oulton	-3976
Office of the Auditor General . Bureau du Vérificateur Général	Yves Godbout	-2243
Municipal Affairs and Environment Affaires Municipales et Environnement	Bill Morrison William Ayer	-2658 -2669
Natural Resources and Energy Ressources Naturelles et Énergie	Lyn Fairweather	-5598
Office of the Premier Cabinet du Premier Ministre	Rick Phillips	-2286

INFORMATION SYSTEM COORDINATORS
COORDINATEURS DE SYSTEMES INFORMATIQUES
NOVEMBER 1988 - NOVEMBER 1988

DEPARTMENT MINISTERE	COORDINATOR COORDINATEUR	'PHONE
Office of the Comptroller Bureau du Contrôleur	Pat Doherty	-2250
Occupational Health & Safety Commission Comm. de l'Hygiène et Sécurité au Travail	Edward Lenarczyk	-2467
Policy Secretariat Secrétariat des Politiques	Mike Wood	-2314
Regional Development Corporation Société d'Aménagement Régional	Gordon Gilman	-2277
Supply and Services Approvisionnement et Services	Jean-Serge Maillet	-2140
Tourism, Recreation and Heritage Tourisme, Récréation et Patrimoine	Dean Mundee	-2070
Transportation - Transport	Emilia Sousa	-2990

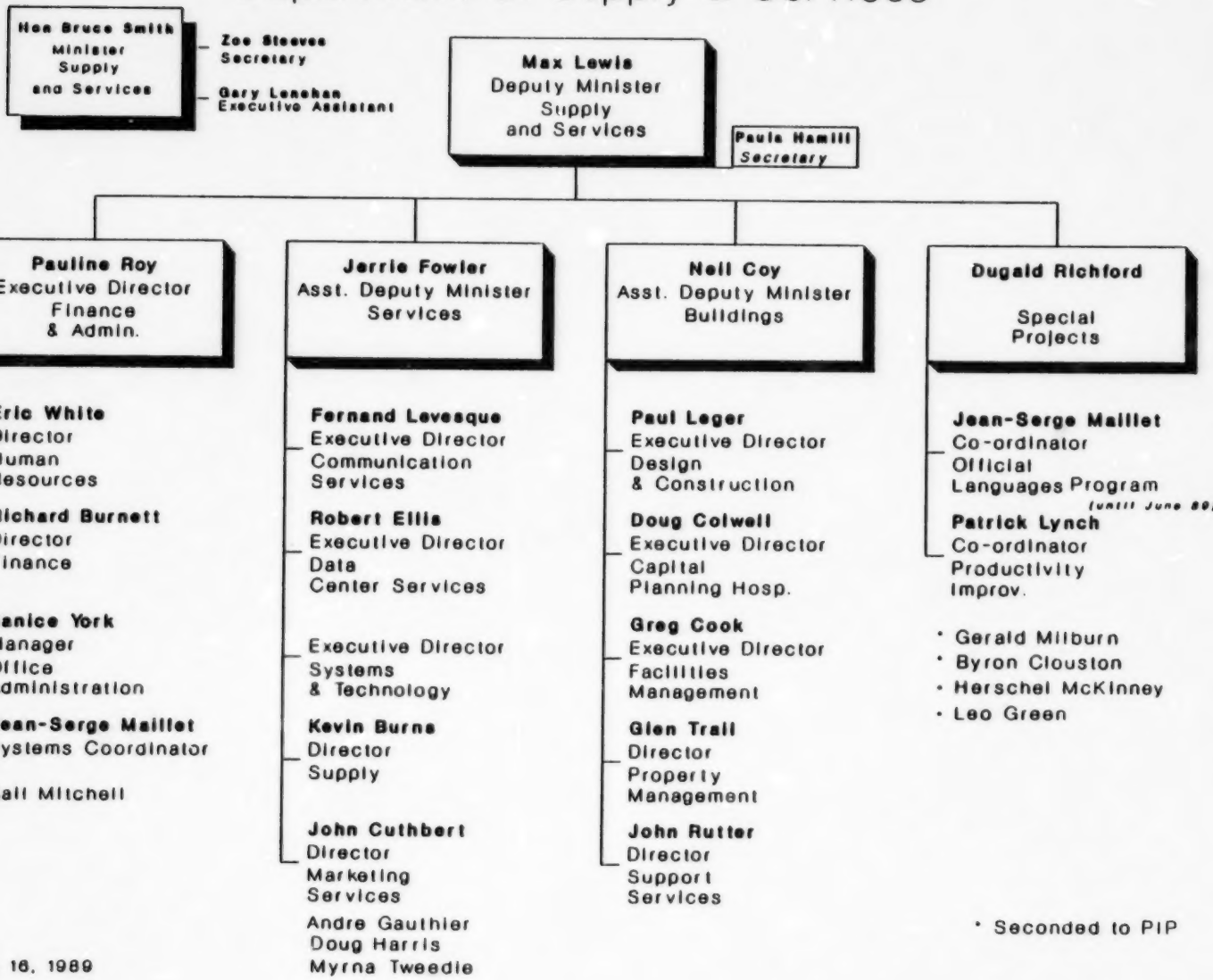
INFORMATION SYSTEMS TECHNOLOGY CONFERENCE

FREDERICTON INN MAY 24, 1989

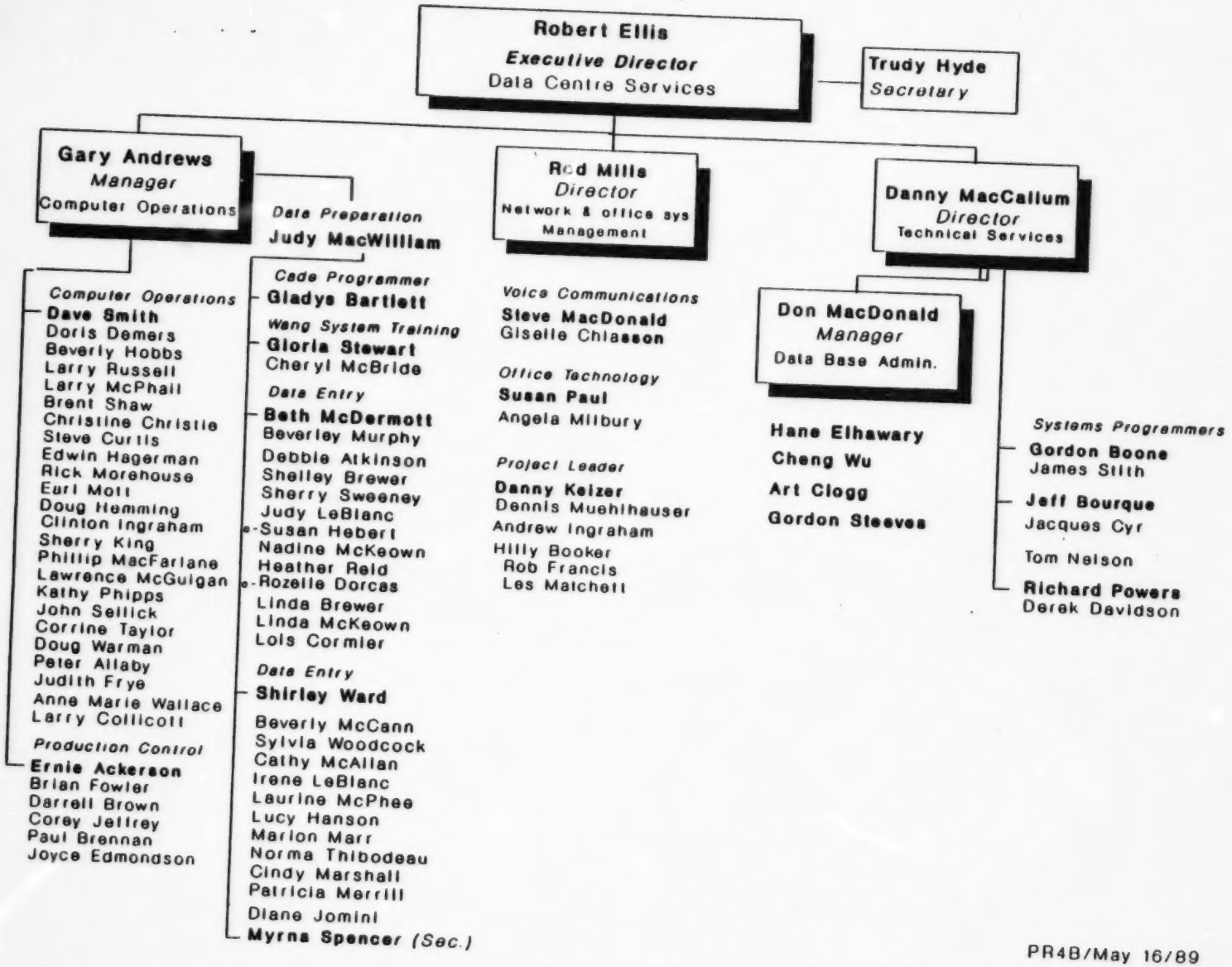
LIST OF CLIENT REPRESENTATIVES

PROJECT LEADER	DEPARTMENTS THEY SERVE
Donna Clark	Income Assistance
David Cowperthwaite	Agriculture
Muhammad Hanif	Justice Education Office of the Comptroller (payrolls) Maritime Higher Education Commission N. B. Higher Education Commission
Mike Hennessey	Municipal Affairs and Environment Finance
Bill Holt	Transportation
Jean Lee	Advanced Education and Training
Diane Nadeau	Human Resources (B.of M.)
George Phillips	Special Projects
Matt Rickard	Health and Community Services Alcohol and Drug Dependency Commission Occupatonal Health and Safety Commission
Dick Slipp	Office of the Comptroller Board of Management Executive Council General Government Legislative Assembly Office of the Auditor General Premier's Office Cabinet Secretariat
Richard Thomas	Commerce and Technology Supply and Services Natural Resources and Energy Tourism, Recreation and Heritage Fisheries Labour Regional Development Commission Non-government Clients

Department of Supply & Services



PR1/May 16, 1989



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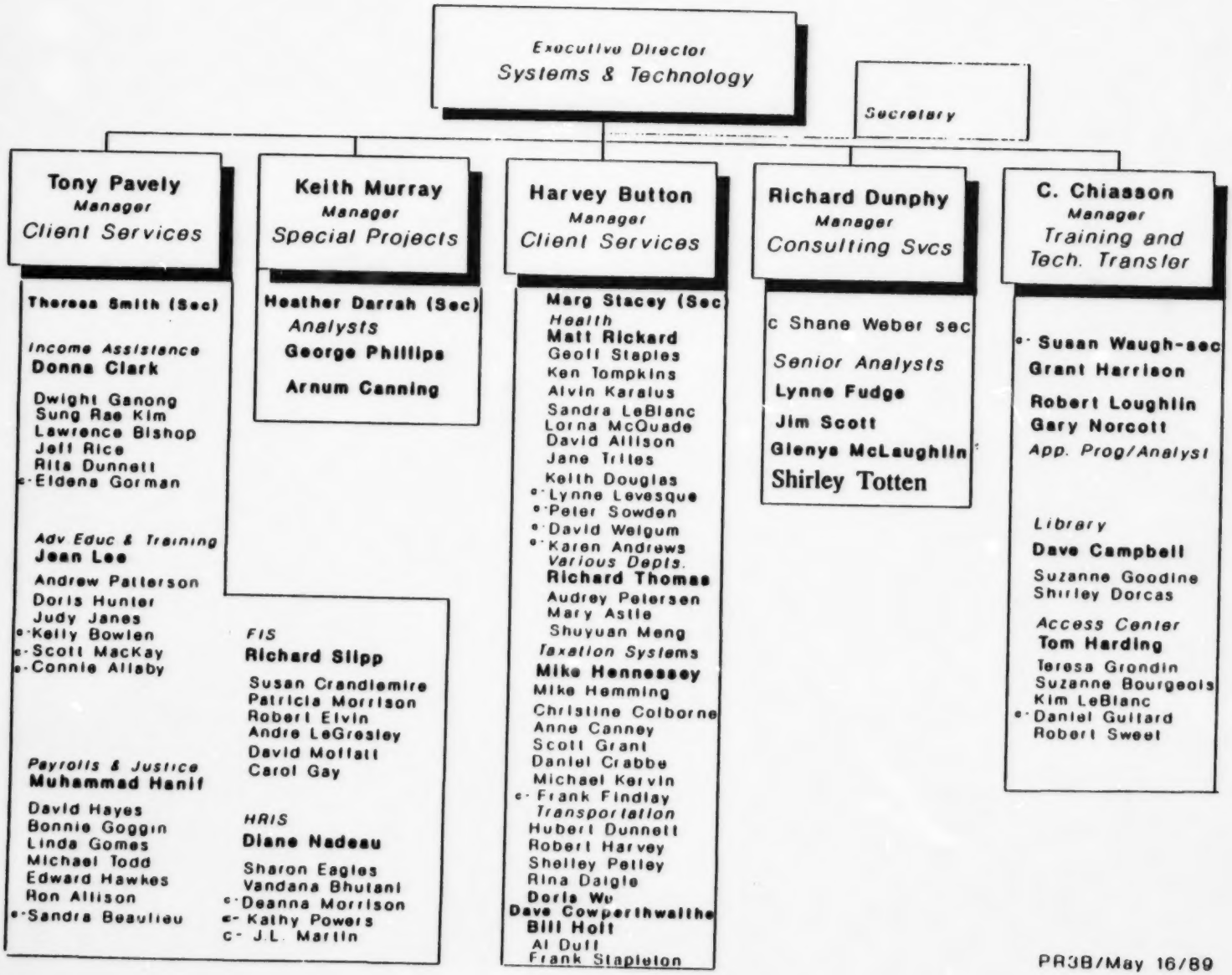

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